

# MODERN Machine Shop

October, 1942



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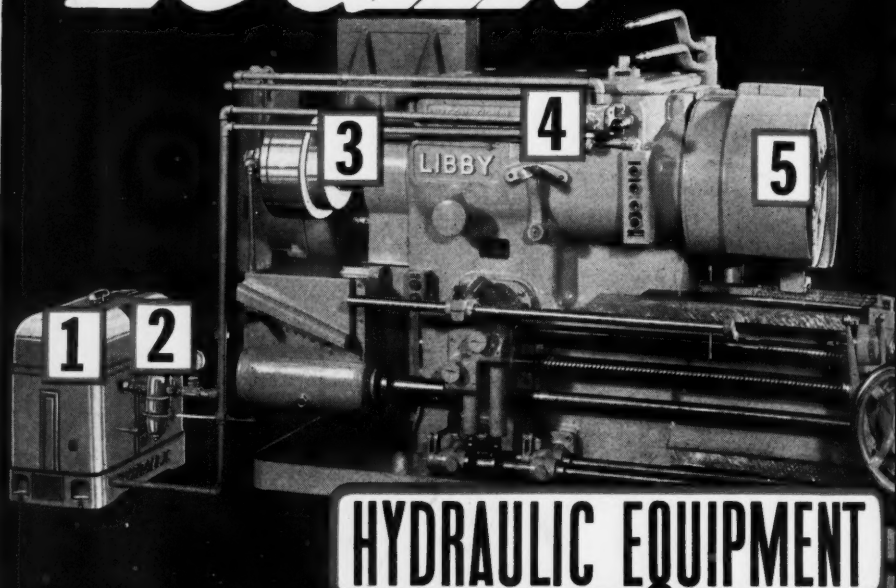
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# MODERN Machine Shop

OCTOBER, 1942  
VOLUME 15 • NUMBER 5

# Contents

HOWARD CAMPBELL, Editor

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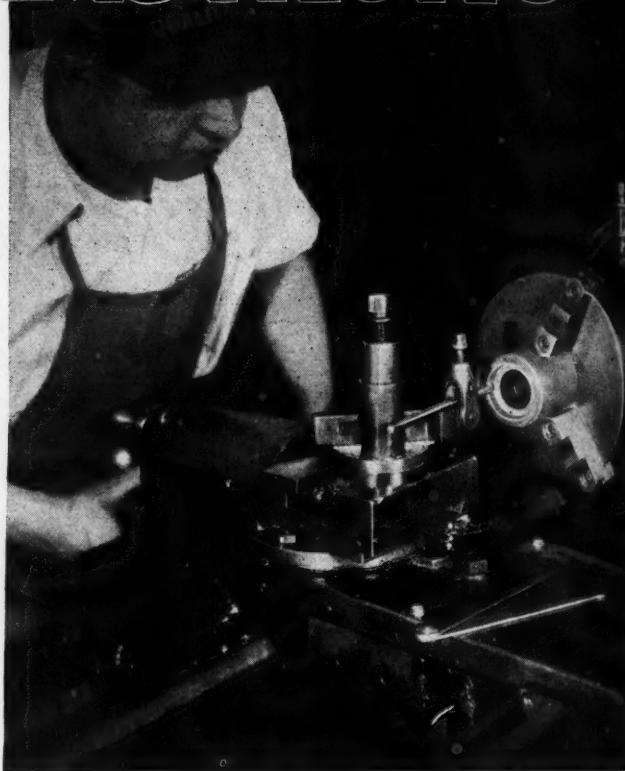
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# MODERN Machine Shop

CINCINNATI, OHIO

OCTOBER, 1942

VOL. 15, No. 5

## We Present ---

—as the first feature article this month—a practical and helpful article describing the apprentice training program at the Chrysler Corporation plant, Detroit, Michigan. Interestingly written so that all machine shop executives can understand, this article describes the need for skilled artisans to meet the demand for war production and the manner in which the Chrysler Corporation has found an answer to this problem. Illustrations depict various scenes taken in the class rooms.

—as the second article—a thorough discussion by Richard M. Rummel, United Air Lines' central maintenance base at Cheyenne, Wyoming, of the interesting and unusual problems encountered in the maintenance of both passenger and cargo planes.

—as the third article—an important and timely article by Major General Lewis B. Hershey, Director of Selective Service, who tells why industry should obtain replacements as our nation's military manpower needs increase. The author points out specific recommendations for a manpower inventory now.

—on page 138—a practical outline for the maintenance of battery-powered industrial trucks by F. L. Sahlmann, Transportation Department, General Electric Company. There has never been a greater need than now to keep industrial trucks in the plant in perfect working order; therefore, the suggestions made by the author should be of interest to all those men responsible for the operation of transportation within the plant.

—on page 160—a complete and concise discussion of the manner in which a modern gage plant has expanded its facilities to reach peak production and quadrupling its last year's record. Many views of actual time and labor saving operations are shown.

—on page 170—a summation of the activities to be carried on at the National Metal Congress and War Production Edition of the National Metal Exposition to be held in Cleveland's Public Auditorium, Cleveland, Ohio, October 12th through 16th. At this convention engineering, technical and production talents will be mobilized in a drive for stimulating greater production.

—on page 180—a survey of material conservation in the welding field which will amaze anyone now engaged in welding.

Several excellent tools are presented in the section "Ideas from Readers" this month and the newest in machine shop tools and equipment will be found in the departments "Tools for National Defense" and "New Shop Equipment." Added to these are the usual cartoon and other departments. And the editor gets "The Last Word" on page 398.



Meeting to Complete Arrangements for Chrysler Cooperative Training Program. Left to Right: O. Frank Carpenter, Detroit's Wilbur Wright High School Principal; John M. Amiss, Director of Industrial Education; George H. Fern, Director Michigan State Board of Control for Vocational Education; John H. Amos, Director of Vocational Education, Hamtramck High Schools, and Lyle G. Ritchie, Apprentice Coordinator, Detroit Board of Education

# A Streamlined Apprentice- Training Program

By GERALD ELDRIDGE STEDMAN

**The need for skilled artisans to meet the demands of war production is one of the nation's principal problems. The Chrysler Corporation's answer to that problem is outlined in this article**

**T**HE fluid drive of Chrysler Corporation, Detroit, Michigan, towards a greatly expanded employee training program is being accomplished with such smooth increase of momentum, as, in itself, to be one of the wonders of war production.

Somewhat staggering in its proportion, urgent in its execution, vital in

its requirements, the foremanship job instruction and apprenticeship training activities of that far-flung concern are being handled with precision through a centralized department upon which has been placed the entire responsibility for the training procedures of Chrysler Corporation's several and various plants.

At the head of this department is John M. Amiss, Director of Industrial Education. Mr. Amiss is a teacher by profession. After seven years as high school principal at Howe, Indiana, he supervised industrial training for Reo from 1918-1928, has been Director of Chrysler Industrial Training ever since. His staff is unusually competent.

Chrysler Corporation's centralized main plant training facilities consist of about 38,000 square feet of floor space containing some 175 production and tool room type machine tools. The importance of precise operational checks is incessantly emphasized from the first day of training. Extensive use is made of visual education. Before an apprentice touches a machine he is conditioned by such sound films as "Production Means Quality." These films point out his importance as part of a team and as master of machines, tools, jigs and fixtures, and tend to develop an appreciation of the importance of tools and gages. Such visual education helps more than anything else to reduce scrap. The apprentice early

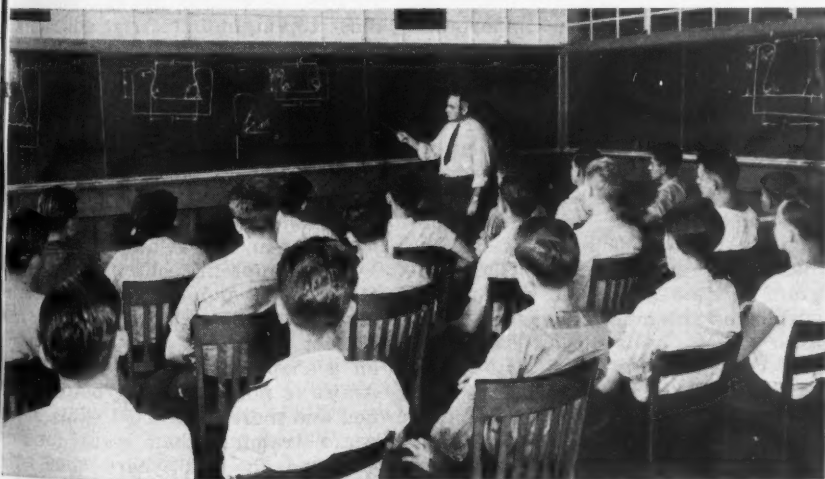
learns that any carelessness on his part may result in multiple waste of all of the precision workmanship that has been applied in prior operations.

Apprentices work in an actual shop atmosphere and on actual production lines, and it is noticeable that those who have been accepted for the Chrysler Training courses have seemed unusually appreciative of the variety of practical production experiences they have gained. This is undoubtedly due to the Amiss philosophy of streamlining apprenticeship training to provide a richness of shop practice rather than to follow the traditional system in which too often time has been wasted on labor that had little training value.

The boys are now getting a particular kick from the knowledge that they are a vital part of the war production program, working on all manner of tank, truck, gun, and bomber parts. To increase this enthusiasm, Chrysler Corporation gives them the feel of a real production line.

The apprenticeship department has a distinct job shop atmosphere. The boys participate in the origin of new

Apprentice Class in Shop Mathematics







Applicants Taking Psychological Test for Entrance to Chrysler Apprentice School

engineering projects. This was true in the development of Chrysler fluid drive, to which thirty apprentices were assigned. It is true of much of the initial production on other vital war jobs. This makes the boys feel they are in on "the know" and gives them a sense of responsibility that otherwise might be overlooked. There is a fluid characteristic to the Chrysler Apprentice plan that gives it unusual adaptability, utility, and merit. This is everywhere noticeable.

(An aside: I thought the "gog, gle-repair" bench particularly unique in teaching apprentices the importance of safety, the art of dexterous assembly, the fluid diversity of training. There have been only two serious loss-time accidents among Chrysler apprentices in the past six years.)

The first responsibility faced by Mr. Amiss after his appointment as director of Chrysler industrial education was the development of a foremanship training program. This program eventually became outstanding within the automotive industry. Then, after a year's basic survey, the Chrysler Apprenticeship Plan was originated in 1935. There are 262 apprentices in training now. This plan is, of course, in addition to other forms of training later to be described.

per cent are now in charge of important designing and supervisory jobs. So valuable is the roundness of such apprenticeship training that some years ago, when there was severe unemployment in Detroit, 50 Chrysler apprentices with two years training all stepped out and got themselves good jobs.

"The absorption powers of these youngsters is a continuous surprise to us," Mr. Amiss states, to support his opinion that the traditional four-year apprenticeship period is unsound. In this, he echoes the conclusions of most top-flight industrial educators have interviewed in Detroit. In the old days, an apprentice would waste his first six months bringing beer to journeymen, knocking icicles from windows, cleaning out cuspidors, sweeping floors, oiling machinery. He would spend six months on a shaper. There was no synchronization of experiences and no related school work.

Now apprenticeship training is streamlined and speeded up, providing greater diversity of training in a shorter period of time. One month on a shaper is found sufficient. Mr. Amiss is now achieving better qualified and more diversified skills in two years training than were formerly achieved in four years time. The

Al Zimmer, first set up on apprentice, is now (year) basic foreman of the tire to go apprentice department too and die given an room. Of the training. many apprentices Wages graduated, better are stand than twenty-five instances,

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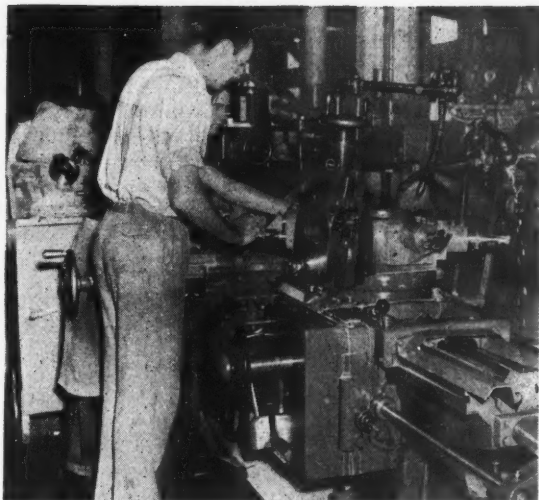
**Chrysler Apprentices Turning  
Out War Production on Warner  
& Swasey Screw Machines**

Chrysler program is now set up on a 4,000-hour (2-year) basis. Those who desire to go further into tool and die room skills are given an added two years of training.

Wages paid apprentices are standard in some instances, in others very generous, compared with schedules throughout the industry. I was particularly pleased to find the rates

covering cooperative and special training distinctly better than average. Industry is to be complimented for its investment in achieving talent and skill through apprenticeship training—and it is an investment. Too often overhead costs are overlooked, such as the costs involved in extra instruction, more scrap, more inspection and the fact that at least 10 per cent of apprentice time is spent in related class room schooling. These costs would represent a considerable tuition or tax if the training were gained in any other manner—presuming it could be. The Chrysler Corporation cheerfully bears this load, realizing the importance of apprenticeship training.

Even without indentures of any kind, these boys want to stay on apprenticeship. There has been no unusual amount of quitting. In fact, turnover has been surprisingly low, even now with the tendency towards job stealing and pirating on the increase. If any apprentice, for example, doesn't like working on the second shift and threatens to quit, the choice is up to him.



Chrysler Corporation operates its apprenticeship training program on a business basis and schedules it to actual needs. With the increased demand for war work, part of Chrysler's training activities have been placed on a "vestibule school" basis. Trainees receive a short course of from three to six months. This is patterned after the last war experience of Mr. Amiss with Reo, where he operated this "vestibule school" technique. Apprentices are given a course in shop mathematics and shop theory. Such other training along lines of blue print reading, drafting, chemistry and metallurgy, are picked up in orderly manner as the actual need arises. "Trained apprentice effort of productive value from the start" is an Amiss policy.

The tremendous demand for skills to meet the needs of war production and the shortage of skilled workers now converge to make training one of the country's principal problems. Green workers must be turned into operators, operators into machine hands, machine hands into job leaders, job leaders into supervisors—all

in a tremendous rush. An excellent example is found in one of Chrysler's outlying plants where the existing supervisory staff must be multiplied ten times and the productive worker list must be increased twenty times before snow flies. Perhaps 60 per cent of this plant's operators will be women.

The great "Training Within Indus-

try" program for this effort is a story in itself. Already, selected groups of sixty operators each are being sent to a large city for special arsenal training. Upon returning, they work on an eight hour per day, six day per week schedule covering four weeks in which Red Cross, labor relations, job instructor training and foremanship training are being provided to supply the needed supervisory staff for this effort. Following this training, they will be intensively trained in operational techniques. This case is but one of many in the tremendous Chrysler Corporation war effort.



Apprentices Learning the Intricacies of Precision Layout Work

Apprenticeship laws in Michigan prevent boys under 18 years of age from being employed at hazardous occupations without special permission from the State Board of Control for Vocational Education. Accidents under this age limit carry double indemnity without this permission. Apprentices, too, require generally a high school education or its equivalent. Some high school graduates at 17 years have to wait for admission. It is now hard to get apprentices to meet apprenticeship requirements. Selective service and the navy are taking boys fast; it is the increasing habit of draft boards to deny requests for deferment. Yet, even the vestibule training system can by no means answer the demand for trained workers now confronting Mr. Amiss' department. He is adeptly getting over this hurdle by projecting other courses.

Training opportunities provided by Chrysler Corporation now consist of four basic courses:

**Course 1. High School Cooperative students from Detroit and Hamtramck Public Schools. Ages 16-18**

years; working and studying alternately two weeks in Apprenticeship Department and two weeks in public schools. All shop work done in Chrysler Apprenticeship Department; not placed in factory departments until over 18 years old. This is later described.

**Course 2. Full-time apprentice training. Ages 17 to 25; must be high school graduates. This is the 4,000 hour course. It includes 4 hours per week of shop theory and mathematics. This group is now operating exclusively on a vestibule school basis.**

**Course 3. College Cooperative Students—from colleges maintaining cooperative training courses. A five-**

year program. These students alternate between Chrysler training department and their colleges, usual periods being one month each.

**Course 4. Special adult training.** Applicants selected from present employees and approved by plant managers. Also, selected college graduates, mechanically inclined and business minded, are eligible. Ages 22-35.

Back in 1928, O. Frank Carpenter, now principal of Detroit's Wilbur Wright High School and co-director of WPB's "Training Within Industry" program for Michigan and Ohio, conceived a "Cooperating With Industry" plan whereby vocational students would alternate their training of two weeks in outside shops with two weeks in school. This plan has proved highly successful and is now being energetically projected by Lyle G. Ritchie, apprentice coordinator, Detroit Board of Education.

Chrysler Corporation moved to gain greatest advantage from these facilities. On July 7, 1942, there occurred a final meeting of John M. Amiss with O. Frank Carpenter and Lyle Ritchie, together with John H. Amos, Director of Vocational Education, Hamtramck High Schools, and George H. Fern, Director State Board of Control for Vocational Education. From this came the Chrysler High School Cooperative Program, now in full swing.

Conditions of this cooperative training plan specify that the applicant must be 16 years old, must have had at least one year of high school education, have had two terms of machine shop, be able to pass Chrysler physical and psychological tests, and have consent of parents to enter upon the training program.

The course is scheduled for four years, 8,000 hours; half of the time to be spent in school until the trainee has graduated. A probationary period of 480 hours is established with-

in which the trainee must qualify. He can be dismissed within this period for lack of ability or infraction of rules.

The trainee attends the public schools as prescribed; is not paid for such attendance on days when he is absent from work. He must also attend mathematics and theory classes in the Chrysler shop four hours weekly. Records of the trainee's daily experience are accumulated; a monthly grading by the foreman is made of such factors as safety habits, learning ability, work willingness, accuracy, productivity, personal habits. Each quarter these gradings, school progress reports, and shop experiences are presented for parent approval.

The trainee receives reasonably continuous employment adjusted to business conditions. Completion of the course provides a high school diploma and a certificate of skill. The certificate is a book bearing the Chrysler name, showing the course completed and trainee grades, detailed shop experience, related instruction and personal characteristics.

The shop schedule involved in this training program is:

	Mos.	Hrs.
Bench and Vise.....	3	500
Shaper .....	2	200
Engine Lathe .....	10	1,666
Vertical and Horizontal		
Mill .....	6	1,000
Drill Press .....	6	1,000
Surface, Internal and		
External Grinders..	2	333
Machine Repair .....	2	333
Turret Lathe .....	6	1,000

It is to be noted that, during the first two years, half time will be spent in school. This represents 1,440 hours of training on regular high school subjects. During the last two years, the trainee receives related occupational instructional four hours

each week, 46 weeks per year in class-work, even after graduation from high school. The related work schedule is:

	Hrs.
Mathematics .....	48
Drafting .....	96
Industrial Chemistry .....	48
Technical English .....	24
Social and Mechanical Problems .....	24
Employer-Employee Relations	24
Physical Fitness .....	24
First Aid .....	24
Arc and Acetylene Welding..	24
Hydraulics .....	24

This adds up to a grand total of 7,856 hours for, the Chrysler High School Cooperative course and will make the trainee an envied journeyman in the metal trades. This cooperative program involves 40 trainees each from Detroit and Hamtramck High Schools. Initial selection is made by the schools. Upon final selection by Chrysler, candidates are provided permission for such occupational training by the State Board for Vocational Education.

Mr. Amiss feels that the fine apprenticeship training results obtained by Chrysler Corporation have been largely a matter of proper selection. He does not believe in "IQ" tests as such, having thrown away a half dozen forms before arriving at the excellent selection and guidance system now evolved. Through this system far faster training results with concurrent benefits in development of initiative, courtesy, and ability to get along with others have been achieved.

The technique involves guidance as well as selection. Many grade "A" types of professional, lawyer, doctor, engineer, and art inclinations, are rejected. The department centers upon those showing mechanical and executive traits. Quite generally, about one in twenty applicants is apprentice material. This will be much

higher under the cooperative arrangement of pre-selection by these two schools. Chrysler psychologist W. H. Winkler, who has an M.A. degree from Northwestern University and 15 years of experience in adult and vocational education. He is a genius in selection and guidance.

All Chrysler apprentice applicants are put through a battery of tests. The first, a basic arithmetic test, uses the Otis Arithmetic Reasoning Test form. The second, the mechanical comprehension test, is based upon the Bennett method. The third, the interest inventory or temperament scale, is developed from forms devised by Stevens. The fourth, an industrial knowledge test, Amiss-Winkler designed, completes the examination.

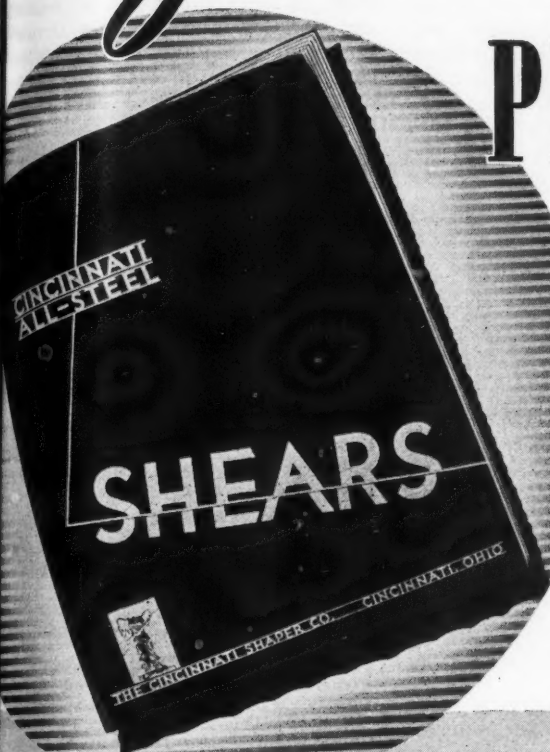
These tests are correlated, averaged at 50 per cent, by internal consistency methods, providing uniformity of scoring or high practical reliability. Use is made of such apparatus as the Purdue pegboard to measure mental-motor responses. This battery of tests requires 90 minutes, and Mr. Winkler devotes another 30 minutes to an interpretation of the test, dwelling much upon occupational interest and pointing out a cluster of considerations involving proper appreciations.

Mr. Winkler has processed thousands of youths and adults. He has in preparation a book "Factor Clusters of Human Reactions and Relations" which only the press of heavy war training schedules has prevented him from completing. Industrial guidance is a new phase that is now being rapidly pioneered. The Winkler factor clusters surround (1) reasoning, (2) abilities, (3) traits, (4) emotions. He makes fine use of acrostics in punching across favorable awareness and memorability of these guidance principles.

The guidance phase of the Chrysler



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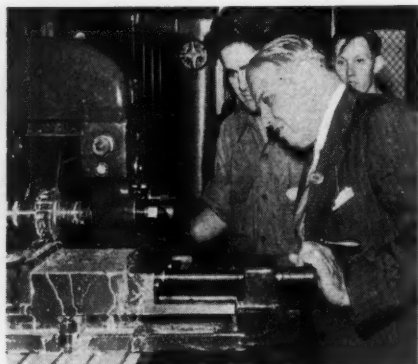
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CINCINNATI, OHIO

ler training technique maintains close follow-up on the shop floor, liaison with foremen and correction of many faults, such as stuttering, as well as the tracing of emotional unbalances to such causes as home troubles, sex, and so on. The Chrysler apprentice comes out of his course with marked leadership abilities and skills, an ability to get along with people, and a definitely optimistic outlook on life.

Chrysler maintains excellent class-



Superintendent Warren E. Bow of the Detroit Public Schools inspecting Chrysler Apprentice Training Department. 260 Graduates of 80 Different High Schools are Enrolled

room facilities, related subjects being taught by instructors in the Apprentice Department. Students carry Machinery's Handbook with them to all class work. To expedite a thorough knowledge of the Handbook as well as to emphasize extreme accuracy and speed in the solution of shop problems, John M. Amiss has written a 372-page text "Shop Mathematics and Shop Theory," to supplement the Handbook.

This book consists of chapters covering preliminary mathematical processes, logarithms, mensuration, geometry, trigonometry, application of shop mathematics, blue print problems, safety and fire protection, manufacturing methods, gauges and meas-

uring instruments, cutting tools, composition and heat treatment of cutting tools, gearing, machine tool Handbook projects; special subjects such as superfine finish, oilite bearing and plastics, and Chrysler Corporation engineering standards. This text supplementing the Handbook, is the neatest arrangement I have seen to answer the needs and practices of machinists, draftsmen, inspectors, tool makers, die makers, and others.

Now, with the Chrysler High School Cooperative plan in momentum, Mr. Amiss has jumped forthwith into the development of a training plan for women. His foremanship training program is mightily increasing. He has a "training the trainer" plan well underway. This he considers the big job of T.W.I. requirements.

Thus the fluid drive of the Chrysler Corporation towards a greatly expanded employee training program carries on. So far as Chrysler is concerned, it will be there "fused with the mostest" in filling the work requirements of its huge war production responsibilities.

**"Torque Versus Horsepower" and "Overhung Loads on Speed Reducer Shafts"** are the titles of two bulletins issued by the Engineering Department of Winfield H. Smith, Inc., Springfield, Erie County, N. Y. Designed to solve speed reducer problems, the bulletins are written in nontechnical language, are well illustrated, and cover the subjects very completely. Copies free.

**Lyon Material Handling Equipment** is the subject of an eight-page illustrated catalog released by the Lyon-Raymond Corp., 1024 Madison St., Greene, N. Y. The catalog includes condensed information on hydraulic lift, pallet, die handling, and sheet-handling trucks, hydraulic elevating tables, hydraulic stacking, tiering, and hoisting equipment, utility trucks and skid platforms, special purpose production machines (hydraulic-powered), and aircraft servicing and production equipment. Copy of Catalog No. 130 free upon request.

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**ARMY E NAVY**

**1938**

37,000  
MAN HOURS PER MONTH

133,000 SQ. FT. OF FLOOR SPACE

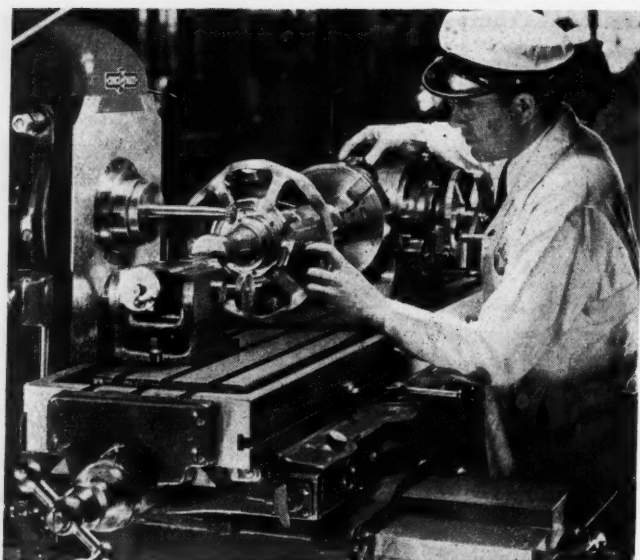
**1942**

266,000 SQ. FT. OF FLOOR SPACE

214,000  
MAN HRS. PER MONTH

THE CINCINNATI BICKFORD TOOL CO.  
OAKLEY CINCINNATI OHIO U. S. A.

"On September 10, 1942, The Cincinnati Bickford Tool Company received its greatest honor, the Army-Navy "E" award for excellence in production. In accepting this award each employee realizes that it carries with it the obligation to maintain our high standards and continually strive for greater production and more efficient metal drilling machines."



Machining a Propeller Shaft for a Transport Plane. The Cincinnati No. 3 Double Type Universal Machine Used on this Job is the Standard Type of Machine Used in the Engine Plant where the Shafts are Made

By  
RICHARD  
M.  
RUMMEL

United Air Lines

## "Keeping 'Em Flying" Is Big Job

**A**IRLINES of the nation this year are flying more miles on more schedules with a greater volume of passenger and cargo traffic than ever before in their history—and skilled workmen in the maintenance shops of those lines are contributing their vital share to the efficiency of such record operations.

With the advent of the war emergency, air speed came to have a new significance to the country at large. Already established as a recognized means of communication and transportation in peacetime, domestic airlines suddenly assumed added importance in providing one of the most valuable factors in the war program

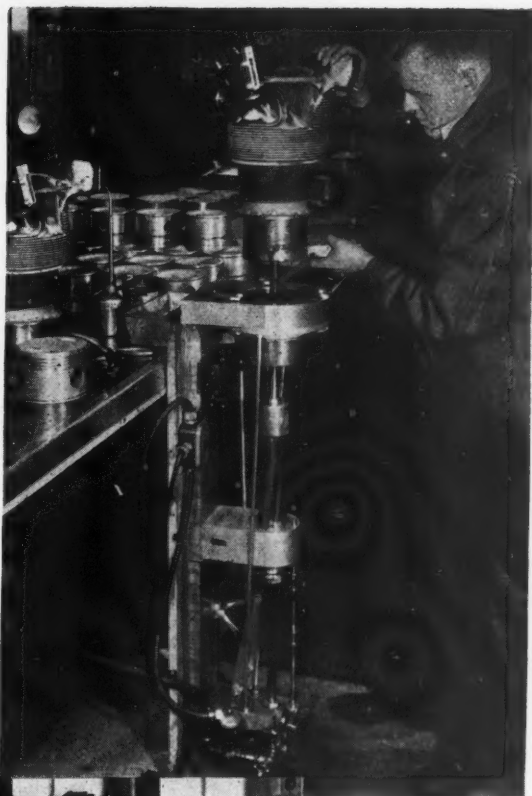
—economy of precious hours for production and defense.

To meet its new responsibilities, the airline industry moved into high gear. Peak winter schedules were adopted for the accommodation of both government and civilian travel and, at the same time, maintenance work was stepped up to keep abreast of the situation. Just recently the Air Transport Association of America pointed out that airline maintenance bases are operating at peak efficiency in guaranteeing the smooth functioning of services which have become "lifelines of national defense in time of war."

Machine shops, modernly equipped

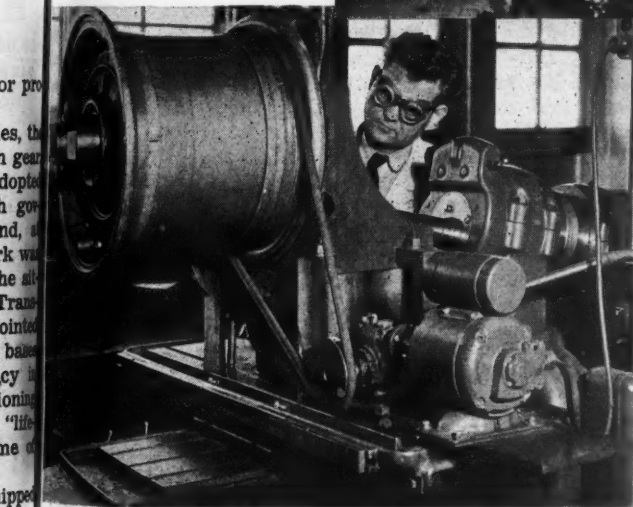
a Propeller for a Trans-Atlantic. The Company's 3 Diesel Engines are Used in the Scavenging Machine. The Engine Plunger Shafts are Made

United Air Lines Designed and Built this Piston Ring Lapping Device. The Mechanic is Shown Using a Tool to Compress Piston Rings so that the Cylinder Can be Fastened to the Base of the Machine. The Piston and Rings Slide Up and Down with a small Degree of Rotation on each Stroke, as Indicated by the Keyway in the Plunger Shaft. The Device is Air-Operated



and staffed by men with a particular knowledge of airline requirements, are of manifest importance to the whole business of air transport maintenance, and, thus, to the broad picture of airline operations. How just one of these functions may be seen at United Air Lines' central maintenance base at Cheyenne, Wyoming.

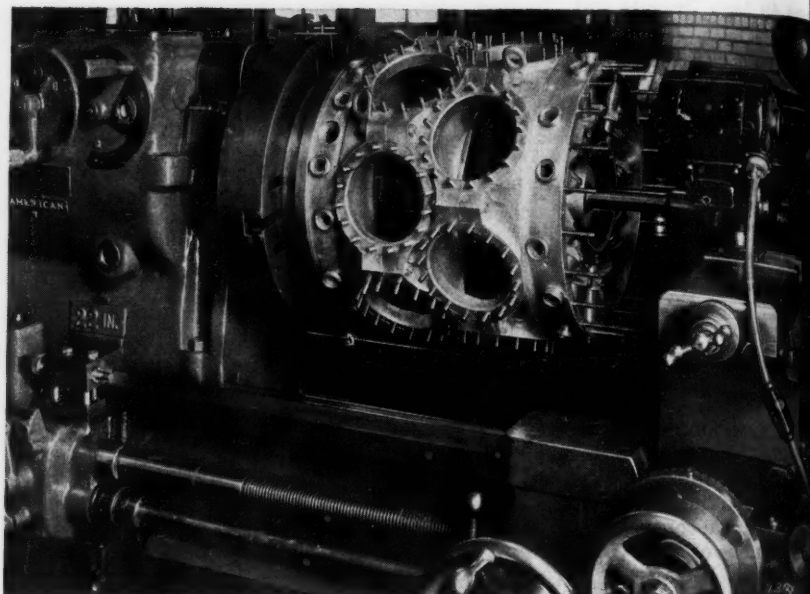
Popularly known as "The Roundhouse of the Airways," United's big



Cheyenne plant is almost an aircraft factory in itself. Here, under the expert attention of approximately

Grinding a Brake Drum, Using a Heald Internal Grinding Machine that has been Rebuilt for this Purpose. Note the Angle of the Headstock, Which Provides Clearance Between the Face of the Wheel and the Inner Face of the Drum





Here an American 22-Inch Lathe, Equipped with a Grinding Attachment, is being Used to Grind the Steel Crankshaft Main Bearing Liners in the Crankcase for a 1200-H.P. Pratt Whitney Engine. The Extra Heavy Construction of this Lathe Provides the Necessary Rigidity to Eliminate Vibration, Thus Ensuring a Perfect Job

500 men, United's day and sleeper Mainliners become, in effect, brand new planes every 725 hours.

There are fifteen shops at the Cheyenne base, all engaged in the job of keeping planes, engines, and accessories in tip-top condition. Many of these are engaged in manufacturing as well as maintenance work, turning out newly-developed items, improving on old ones, and making replacement parts.

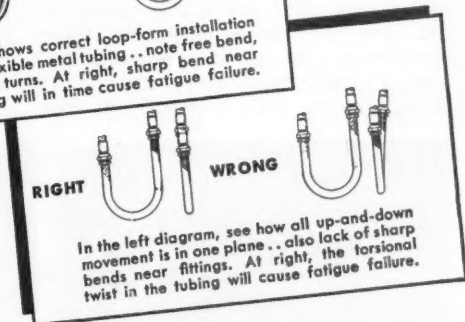
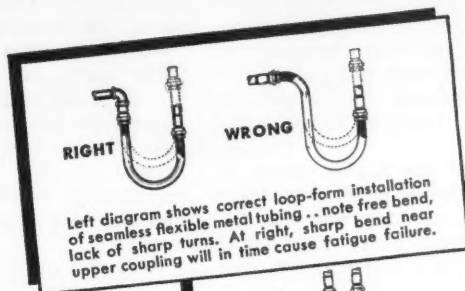
Not the least of these is the machine shop, where 25 men are employed under the direction of A. M. Hufmeyer, foreman. While not so extensive, as machine shops go, United's is completely and modernly equipped for the specialized work that is done there.

The machine work that is done at the Cheyenne base includes grinding,

drilling, milling, facing, turning, and all the other operations necessary to the maintenance of the huge planes and their 1200 h.p. power plants. As a matter of fact, the machinists that work on these jobs must be more than operators; they must be familiar with the principle of design and construction of the engines so that they will know what can and what cannot be used in making repairs. They must also be familiar with the characteristics and machining qualities of the metals from which the various parts are made.

The machine shop and its personnel must be prepared to handle all kinds of jobs as part of their routine, including such jobs as machining various engine and landing gear parts, overhauling wheels and brakes, lapping retracting struts, lapping pistons

# How to get long life from Seamless Flexible Metal Tubing



**P**ROLONGING the life of equipment today is more than just a dollars and cents practicality... equipment like American Seamless and other American Metal Hose products is almost priceless, very often irreplaceable until the war is won.

Correctly installed, American Seamless Flexible Metal Tubing can be counted on for lower costs and invaluable durability in numerous applications—such as conveying steam, liquids and gases, for controlling vibration and for connecting misaligned or moving parts.

The "right and wrong" of two important installation factors are shown above. There are others equally important—minimum bending diameters and overall lengths, and support for horizontal installations. Complete information will be found in our Bulletin SS-M, free on request.

42188A



**American  
Metal Hose**

CAN METAL HOSE BRANCH of THE AMERICAN BRASS CO.  
 Offices: Waterbury, Conn. • Subsidiary of Anaconda Copper Mining Co.  
 In Canada: Anaconda American Brass Ltd., New Toronto, Ontario

rings, and manufacturing special parts and fittings of all kinds. The equipment includes a complete assortment of machine tools of the latest design and a complete heat treat department for use in tempering and hardening tools and small parts.

A department has been set aside for the overhauling and repair of hydraulic control valves, panels, and actuating units. Considering the fact that every Mainliner's landing gear, wing flaps, cowl flaps, brakes, and automatic pilot are hydraulically-operated, this is an important phase of United's overhaul operations. Linking the hydraulic department with the machine shop was decided upon because of the considerable amount of machining done on various units of the hydraulic system.

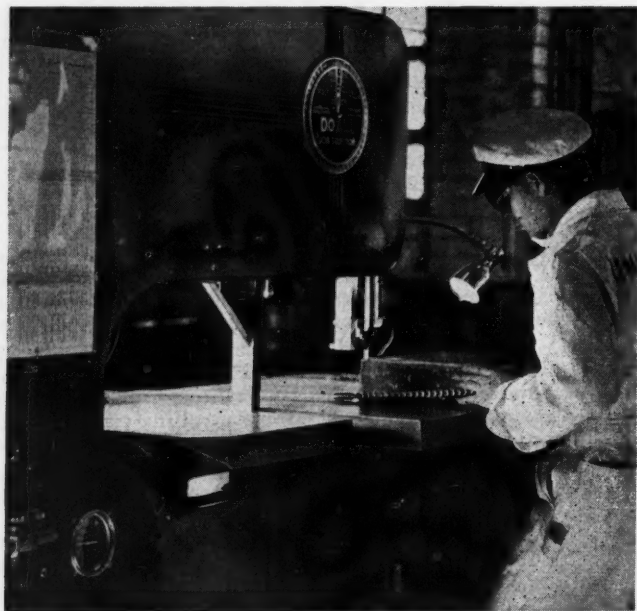
Day and night the fifteen shops at the Cheyenne base carry on their operations, just as—day and night—United's Mainliners carry their loads of passengers, mail, and express over

the company's vast airways system. Currently, the Mainliners are flying some 68,500 miles daily, closely linking key cities, production areas, training camps, military bases, and other important civil and military establishments throughout United's coast-to-coast and Pacific Coast system.

After each 725 hours in the air, the Mainliners are routed to Cheyenne where they are completely stripped of engines, propellers, instruments, radio equipment, batteries, control surfaces, cabin furnishings, and even the cabin floor boards. One by one the various parts and items start their parade to the shops designated to overhaul them. Other, duplicate items, already completely overhauled and inspected, meanwhile are started moving toward the plane. Just 48 hours after its arrival at the base, the Mainliner, completely overhauled, re-equipped and checked, is ready to take the air again.

Such major overhauls at Cheyenne

are, of course, only a part of United Air Lines' maintenance activities. The company operates large, well-equipped service stations at New York, Chicago, Los Angeles, Oakland, and Portland, where Mainliners are given periodic



This Mechanic is Using a DoAll "Metal Master" to Machine a Forming Die from a 3-Inch Steel Block. The Chain is Part of the Feeding Mechanism. The Machine will Cut up to Ten Inches in Thickness.

# Any war plant can have this free advisory service



**L**IGHTING bottlenecks, often unsuspected by plant managers, may seriously impede war production—especially on night shifts. Glare in the eyes of workers, shadows on work, dirt and grease on lamps and fixtures, improper placing of fixtures, can slow up production and increase spoilage. Inexpensive changes in lighting often make a decided difference.

As a part of its contribution to the war effort, General Electric is glad to offer the services of its staff of trained lighting men—without charge—to any war factory, large or small.

**THERE ARE NO STRINGS TO THIS OFFER** — no obligation to buy so much as a bulb. The G-E lighting man's first job is to

try to make better use of present lighting equipment. He checks to see if lamps are proper size. Occasionally he finds a spot where a supplementary light will help with some critical job. And he only recommends a new lighting installation where it is absolutely essential to production.

**TO TAKE IMMEDIATE ADVANTAGE** of this free service, all you need to do is this: Call your local General Electric lamp office, or your G-E lamp supplier, or write General Electric Company, Nela Park, Cleveland, Ohio. Your local power company is also ready to give you this same kind of help.

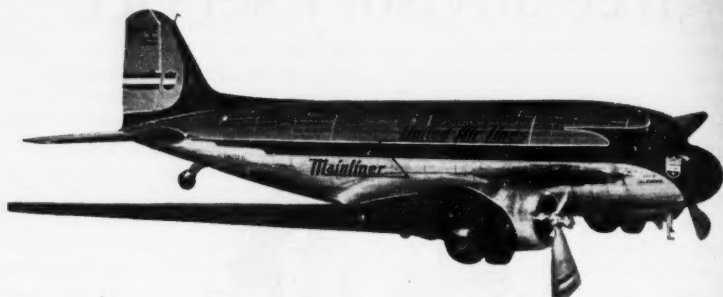
If light can work harder in your plant, now is the time to find out about it!

**G-E MAZDA LAMPS**  
**GENERAL  ELECTRIC**

odic checks in between their visits to Cheyenne.

Air transportation is today accomplishing the greatest mission in its history—that of eliminating time and

distance between our population, war production and military centers throughout the forty-eight states. And the maintenance shops are doing their part along with the production plants



## Two-Man Labor-Management Drive Committee

**T**HE two men pictured here, whose combined ages total 139 years, comprise the entire war production force in a shop at Bay City, Michigan, where they have been working quietly 15 hours a day, 7 days a week, for the past 18 months. During this time they have machined 18,000 steel flanges for war machinery.

Mr. Jake Sparling, 60-year-old head of

the firm, reported to President Roosevelt that he handles the heaviest castings while his assistant, Percy Fogelson, 79 years old, handles the lighter ones. Mr. Sparling said that "they were very glad to be able to help in this defense work. It gives us money to buy war bonds and stamps."

The President referred the letter to Chairman Donald Nelson of the War Production Board, and Mr. Nelson instructed that they be sent a large American Flag poster. He also wrote to Mr. Sparling

complimenting the two-man organization on their war effort and stating that the name of their firm had been entered at the top of the lists of plants formally enlisted in the War Production Drive.



Messrs. Jake Sparling and Percy Fogelson working for the War Effort  
(Official OWI Photo)



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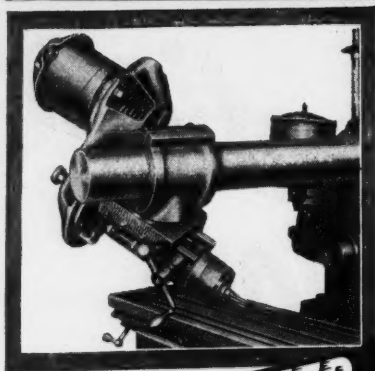
**Vanadium-  
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**Vanadium-Alloys**  
**STEEL CO. LATROBE, PA.**

**HIGH SPEED ALLOY AND CARBON TOOL STEELS**

# New HALCO UNIVERSAL HEAD



**FOR HIGH SPEED**  
MILLING, DRILLING, BORING  
AND COUNTER BORING  
ON ANY ANGLE

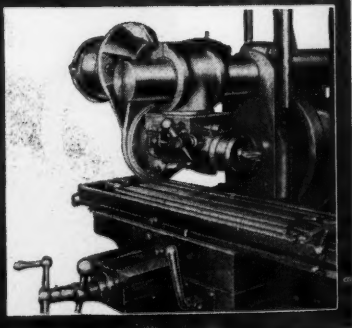
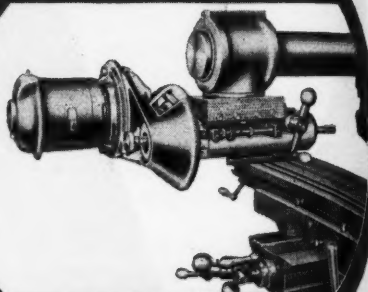
**T**HE Halco Hi-Speed Universal Milling Attachment has proven its importance in building tools, dies, jigs, fixtures, wood and metal patterns and other machine products. Its 4-inch vertical travel permits many milling, boring and facing operations in one setup, a factor of convenience to which is added the advantage that the unit can be easily mounted by one man, it weighing only 90 pounds. Each head is unconditionally guaranteed for six months.

## IMMEDIATE DELIVERY

(Designers and Builders of Fine Machine Tools)

*for High Speed*  
**MILLING, DRILLING, BORING and COUNTER BORING**

Five Speeds 350 to 2900 R.P.M. Also  
10 speeds 125 to 2900 R.P.M. available  
at extra cost.



SEND TODAY FOR FOLDER

# AJAX ENGINEERING & MFG. CO.

MANUFACTURERS OF HALCO PRODUCTS

14230 BIRWOOD AVE.,

DETROIT, MICH.

SAL  
AD  
BOR  
DRIN  
Also  
available

# **SPECIFICATIONS**

1. Swing Over Bed, 10 1/2"
2. Bed Length, 43 1/4"
3. Spindle Hole, 25/32", Capacity, 3/8"
4. Preloaded Precision Ball Bearing Spindle Mounting
5. 12 Spindle Speeds, 30 to 1450 R.P.M.
6. Cross Slide Stroke, 3 1/4"
7. Six Position, Automatic Indexing Turret
8. Stroke of Turret, 3 1/4"

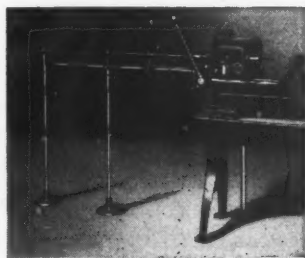
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NO. 830 LOGAN 3/8" CAPACITY HAND SCREW MACHINE

## **THE NEW LOGAN TURRET LATHE MEETS SPECIFIC NEED FOR WAR PRODUCTION**

The recently announced Logan Turret Lathe was developed to supply the demand for a durable small hand screw machine capable of accurate, continuous production. Small parts made from bar stock of 3/8" diameter and less can be turned out with the same speed and precision as that of larger machines and thus release the latter for heavier work. Built to rigid and exacting specifications and the same high standards as the other lathes in the Logan Line.



The Logan Bar Feed is offered as an accessory for the No. 830 Hand Screw Machine. Maximum capacity 3/8" round stock. Maximum stroke 2" Patented safety cam action locks collet and operates bar feed.

**LOGAN ENGINEERING COMPANY • Chicago, Illinois**



**A NAME TO REMEMBER WHEN YOU THINK OF LATHES**

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CH.

# Take a Manpower Inventory Now

*Industry Advised To Obtain Replacements As National Military Manpower Needs Increase*

By MAJOR GENERAL LEWIS B. HERSHEY, U. S. A.  
Director of Selective Service

**M**ANPOWER is, today, a most important strategic material. Every employer should make a prompt inventory, analysis and appraisal of the manpower in his own plant as he would inventory his stock pile. In order to keep production going and at the same time furnish men for the armed forces, industry should now establish an orderly worker-replacement program.

In order to secure temporary deferments for essential men while he is training women, young men, older men, men physically handicapped or those with a high degree of dependency, the employer should know the fundamental principles in the operation of his local Selective Service Board. Certain steps should now be taken by each employer. He should know how many men on his pay-roll are between the ages of 20 and 45. He should investigate the classification of every one of those men. On the basis of such an inventory, he should prepare to plan ahead and train men for replacement of those who must necessarily enter the armed forces if we are to have the sort of army needed to win the war.

Deferments, granted so that employers may train women or men not

liable to early induction, are temporary deferments; they cannot exceed six months and in many cases may be for only thirty, sixty or ninety days. The Army today has to train a bomber pilot within a period of eight months to operate a very technical machine with an instrument board which puzzles an expert. Why, therefore, should industry assume that it can take two or three years to train men for industrial tasks not nearly so complicated?

The fundamental purpose of every deferment of a registrant is to allow an employer to train a replacement. Only in a few rare instances can an employer expect to have these temporary deferments continued for more than the six months period. There are only in cases where an abnormally long period of training is required for a replacement, and the eight months needed in which a bomber pilot can be turned out, is something to remember in the connection.

## Employer's Responsibility

Employers may seek the deferment of their necessary men with or without their consent. Here is how they go about it.

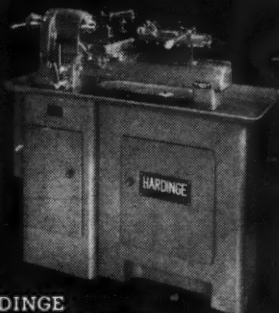
On page 3 of the Selective Service

# "Performance has established leadership for HARDINGE High Speed Precision Machines"

HARDINGE High Speed Precision Machines with preloaded ball bearing spindle construction are fast, accurate and dependable. This combination, together with the ease and simplicity of operation enables relatively unskilled operators to rapidly produce parts to the necessary close limits without expensive tooling.



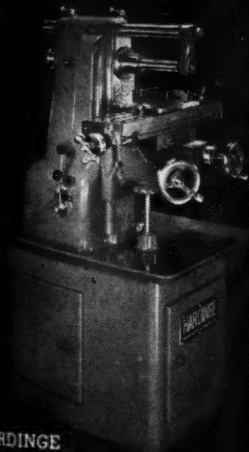
HARDINGE  
HIGH SPEED  
PRECISION LATHE



HARDINGE  
HIGH SPEED PRECISION  
SECOND OPERATION MACHINE



HARDINGE  
HIGH SPEED PRECISION  
TOOL-ROOM LATHE



HARDINGE  
HIGH SPEED PRECISION  
MILLING MACHINE

**HARDINGE**  
ELMIRA, N. Y.



Questionnaire (Form 40) which is sent to each registrant before he is classified is the following:

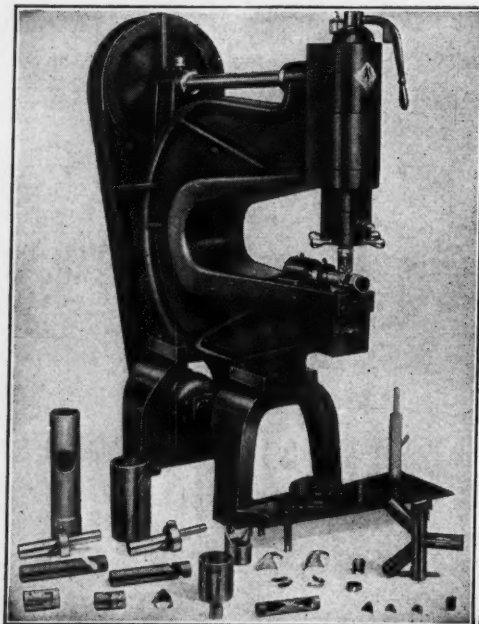
**INSTRUCTIONS.—IF YOUR EMPLOYER BELIEVES THAT YOU ARE A NECESSARY MAN IN A NECESSARY OCCUPATION, IT IS HIS DUTY TO FILL OUT FORM 42A REQUESTING YOUR DEFERMENT. YOU MAY ALSO ATTACH TO THIS PAGE ANY FURTHER STATEMENT BY YOURSELF WHICH YOU THINK THE LOCAL BOARD SHOULD CONSIDER IN DETERMINING YOUR CLASSIFICATION. SUCH STATEMENT WILL THEN BECOME A PART OF THE QUESTIONNAIRE.**

This is on all the questionnaires distributed during the past six months. The fact that the Selective Service System now specifically mentions the filing of Form 42A as the manufacturer's duty is a clear indication of the Selective Service System view on

the responsibility of each employer in this matter. The employer can secure Form 42A at the local board and the local board will consider the employer's request when the form is properly filled out and signed.

If such request should be denied because the man, after consideration of the claims offered for him, is not considered to be indispensable to the company's operation, and is needed more in the armed services, the local board will advise the employer of its refusal of such an occupational deferment. The local board does this by sending to the employer, at the same time it notifies the registrant of his classification, a Form 59.

There are ten days after Form 59 is mailed by the local board to the employer during which the employer can appeal the registrant's case. The registrant will not be ordered to report for induction during this ten-day period. In order to take an ap-



For **FAST** and **SAFE** cutting of sheet metal, duplicating parts, and to relieve other machine tools, investigate the

## **SAVAGE NIBBLING MACHINE**

**TUBE SLOTTING AND TUBE SHAPING**  
For cutting flat sheets by template or to a scribed line.

### **Cutting Capacities**

Flat Sheets Mild Steel  $\frac{1}{4}$ "

Tough Alloys  $\frac{3}{16}$ "

### **Tubing**

Wall thickness to  $\frac{1}{8}$ "

1" I.D. to 36" O.D.

### **Throat Depth**

12" to 36"

Ask for **BULLETIN "G"**

Showing Tube Cutting Attachments  
The Fastest Method of Tube Cutting

Manufactured by

**W. J. SAVAGE COMPANY**

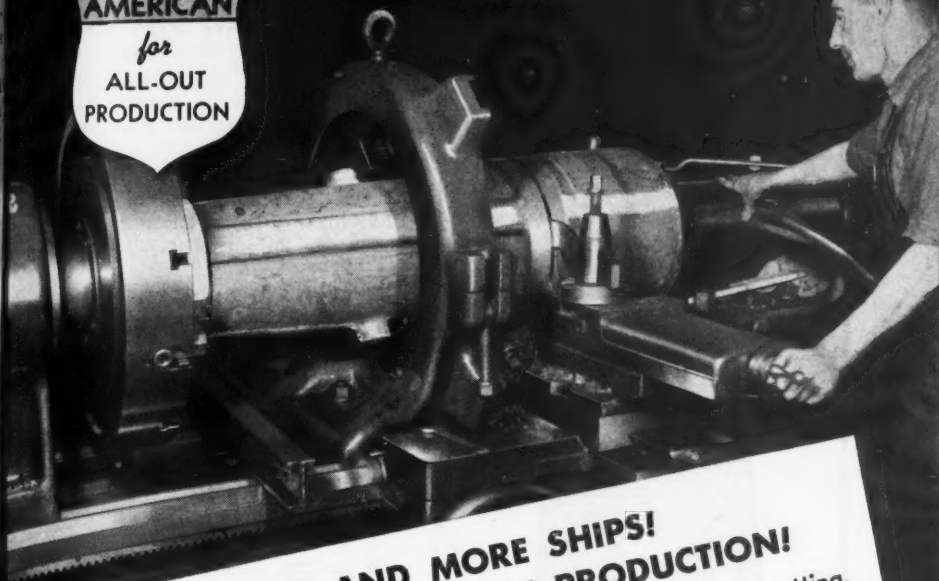
Since 1885

**KNOXVILLE TENNESSEE**  
Pioneer Manufacturers of Nibbling Machines



**"AMERICAN"**

for  
**ALL-OUT  
PRODUCTION**



## **SHIPS AND MORE SHIPS! PRODUCTION AND MORE PRODUCTION!**

That's what the Navy needs and that is exactly what the Navy is getting. Hundreds of "American" Lathes are operating on a 24-hour schedule to give the Navy the ultimate in production.

In our Navy Yards and Shipbuilding Plants "American" Lathes are meeting every challenge of increased schedules. They are producing as they have never produced before and at the same time are maintaining amazing standards of accuracy.

For all-out Lathe production, call on "American."

### **THE AMERICAN TOOL WORKS COMPANY**

CINCINNATI, OHIO, U. S. A.

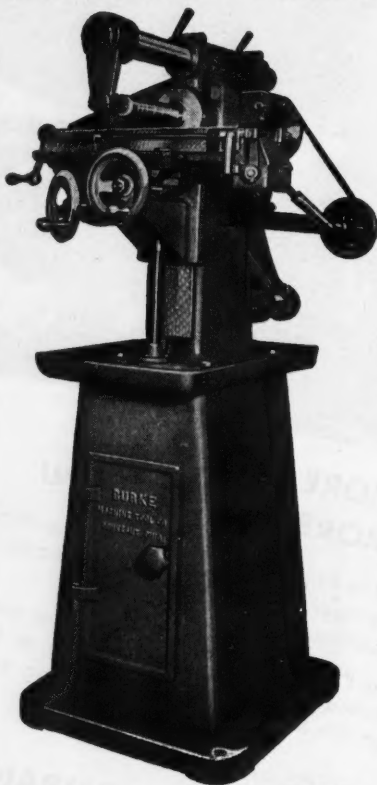
Radials

Shapers

Lathes

# **"AMERICAN" ENGINE LATHES**

# BURKE MILLING MACHINES



**No. 4 Motor Driven MILLING MACHINE**  
Mounted on Cabinet Column

Burke motor driven milling machines Nos. 1, 2, 3, and 4 are specially suited for handling small, difficult work on a production basis.

*Write for complete information.*

**BURKE MACHINE TOOL CO.**  
297 E. 16th St.      Conneaut, Ohio

peal, the employer simply has to sign his name to Form 59 which he has received, and return it to the local board; or in case the Form 59 is not received from the local board, any written request will have full value to make such an appeal effective. When Form 59 is returned by the employer the appeal procedure becomes automatic.

All necessary forms are available at the local board in the employer's immediate vicinity or at the office of the State Director of Selective Service.

If the local board and the appeal board deny the appeal for the occupational deferment of a key man, the employer may then bring the matter to the attention of the State Director at the State Selective Service Headquarters, with the request that the case be reopened or appealed by him to the President.

## Definite Duty

A double duty rests upon the employer. He should personally know what his manpower situation is. He should not leave the job to a minor employee to decide who is necessary. The employer who delegates the task of filing a request for deferment to a clerk; the executive who does not make a complete inventory of his whole plant today, is negligent. Likewise, the employer who files requests for deferment of men who can be replaced by women, or others, is keeping reinforcements out of an Army which is battling for us all.

The employer engaged in essential war production who has been required to greatly expand his plant and who then fails to request deferment for his key men is also negligent.

A good rule to follow: Don't ask deferments for any men who can be replaced by training another individual not likely to be eligible soon for service in the armed forces. Make an inventory, request deferment for

## POP'S ON THE WAR-PATH AGAINST WAR-WORK WASTE

THERE GOES A BLISTERING FOR SOME BUDDY! ... POP'S DISCOVERED A SWELL NICHOLSON SHEAR TOOTH FILE PERFECTLY RUINED ON A FOUNDRY CASTING JOB...

THAT'S THE SECOND WAR DANCE THE OL' MAN'S PUT ON TUESDAY. THIS AYAM HE CAUGHT JO GLUB SCUFFIN' THE DAYLIGHTS OUT OF THE TEETH OF A BRAND-NEW NICHOLSON BY RAMMIN' IT INTO A KIT OF TOOLS LIKE HE WAS HEAVIN' SCRAP IRON ...

POP HAS ABOUT AS MUCH RESPECT FOR A DRIP WHO'S CARELESS WITH TOOLS AS A SKUNK HAS FOR HUMAN DIGNITY!



**I**NDUSTRIAL man-hours were never more precious; high productive capacity never more urgent than right now. There is still too much waste of tool life through *improper use, improper care and improper selection.*

Files are especially exposed to these life-shortening abuses—particularly in new or partly trained hands. Shop managements can save filing time, improve efficiency, speed production, reduce rejects and material wastage, through education on

the right *use and care* of files—and *The right file for the job.*

Nicholson and your mill-supply house can help you. Nicholson is an authoritative consultant to whom you can bring your filing problems freely.

**FREE LITERATURE** on the fundamentals of filing. **FREE TECHNICAL BULLETINS** on special files for Stainless Steel, Aluminum, Brass, Plastics, Lead, Die and Foundry Castings, Die Making, Shear Tooth and Lathe filing. Name the ones you want.

**NICHOLSON FILE CO., Providence, R. I., U. S. A.**

(Also Canadian Plant, Port Hope, Ont.)

# NICHOLSON FILES

FOR EVERY PURPOSE

**NICHOLSON**  
**U.S.A.**

MADE IN U.S.A.

any man whose immediate going into the armed services would retard production of vital war material or other services essential to the war effort, or who is needed to maintain national health, safety and interest.

Only when an employee is working in a critical occupation within an essential industry should a Form 42A be filed for his temporary occupational deferment.

### Make Replacements

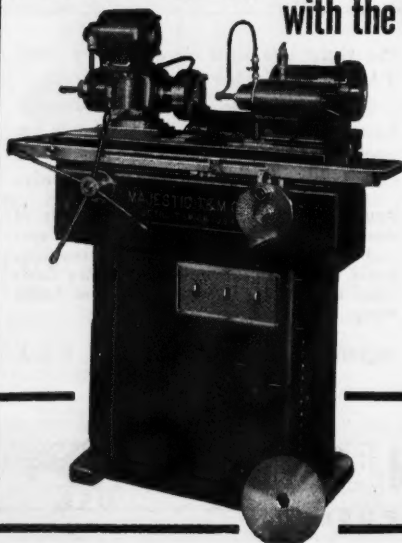
Yes, an inventory within a man's own plant is called for; also an appraisal and analysis of the manpower in the community. There is many a man over 45, or a man physically handicapped, or a woman who can do that job that the 23-year-old boy is doing who took a 12-week course at a learn-quick school.

There are not more than sixty million people in this country who are capable of effective productive effort.

These men and women represent our total manpower available to win the war. They must do everything that must be done in a total war; maintain transportation, communications and utility systems, maintain public services, grow food for ourselves and our allies, mine the metals and produce raw materials and fabricate consumers' goods and the supplies, weapons and munitions of war; also, most of all, they must provide the men who land on strange shores in far places; the men who carry the fight to the enemy on a multitude of far-flung frontiers.

The rest of the population, who mine raw materials and produce the weapons with which these men fight, must be a self-disciplined team working in unity. The individual person's convenience, comfort or pleasure, or the convenience and ordinary leisurely replacement programs of the employer, will have to be given progressively less consideration as the war

## SIMPLIFIED INTERNAL GRINDING with the MAJESTIC INTERNAL GRINDER



An exceptionally wide range of internal grinding jobs can be handled on the New Majestic Internal Grinder. Its simplicity of design and ease of operation are features of utmost importance in providing maximum grinding output at low cost.

### SPECIFICATIONS

Length of table, 48". Swing over table, 10". Travel of cross slide,  $2\frac{1}{2}$ ". Precision dial graduated to .0001". Precision bearing work head. Speeds — 100, 225, 350 r.p.m.

Write for complete details contained in New Bulletin

**Majestic Tool & Mfg. Co.**  
2950 E. Woodbridge Detroit, Mich.



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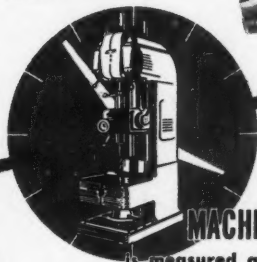
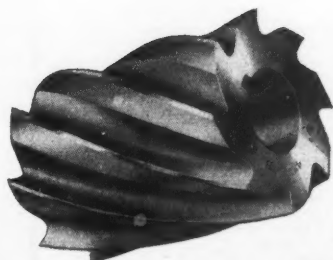
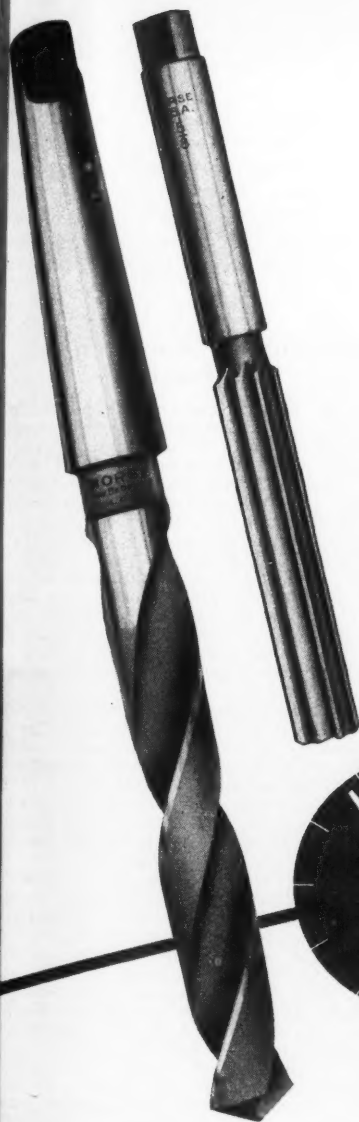
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## MACHINE TOOL PRODUCTION . .

is measured at the workhead. It goes up or down - with the quality of the tools. So give your operators MORSE TOOLS . . . maximum efficiency at the cutting head. Then you'll see why many plants have increased the capacity of their machine tools without buying new equipment.

# MORSE

**THERE IS A  
DIFFERENCE**

## TWIST DRILL AND MACHINE COMPANY

NEW BEDFORD, MASS., U. S. A.

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*Smoother*  
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These CATSKILL Abrasive Cut-Off Machines are cutting gear blanks, unannealed stock, tubing, extruded bars, cylinders, high carbon steel, pipe, etc.—without a secondary finishing operation. Solids to 2" and tubing and shapes to 3".

Cutting wheel runs in a slotted pipe through which coolant is pumped. This prevents surface hardening, burn and burr, and insures a smooth finished cut.

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**CATSKILL METAL WORKS, Inc.**

Manufacturing Engineers

CATSKILL

NEW YORK

gets tougher and the casualty lists grow.

When we hear of the big armies we are going to raise, we must all remember that it takes at least five men or women to produce what one soldier eats, uses, fights with, and wears. With less than sixty million available in this country, those figures are worth deep consideration.

### Metallurgists Wanted in the War Program

In the mobilization of manpower for the civilian war service of the Government there is a continuing call for scientifically and technically trained men and women. Among those urgently needed are metallurgists for work in connection with specific problems in the field of metallurgy—problems connected with some phase of the war program.

The Civil Service Commission is recruiting metallurgists under two new examinations recently announced: Announcement No. 238 for positions paying \$2,600 to \$5,600 and Announcement No. 254 for junior grade positions paying \$2,000.

For the higher grade positions (\$2,600 to \$5,600) the requirements now are completion of a four-year course with major study in metallurgy or closely allied subjects and a minimum of two years of professional experience (which may include college teaching) in metallurgy. Additional experience will be required for the higher grades.

For the junior grade positions (\$2,000) the requirements are: (1) completion of a four-year college course in metallurgy or metallurgical engineering; or (2) completion of a four-year course in an allied subject supplemented by (a) one year of paid experience in metallurgy (which may include college teaching) or (b) 15 semester hours in metallurgy or metallurgical engineering, or (c) the War Training Courses in metallurgy. Applications will be accepted from college senior or graduate students who expect to complete the required course within six months after filing applications.

There are no age limits for these examinations. No written test is required.

Announcements and application forms may be obtained at any first- or second-class post office or from the Civil Service Commission, Washington, D. C.

# REMEMBER, SON, FINE TOOLS DESERVE PROPER CARE !



Keep Your Turret Lathes Properly Leveled

Lubricate Your Machine at the Start of Each Shift



Reprints of this page in 9" x 12" size are available free for bulletin board use in your turret lathe department. Write the Gisholt Machine Company, 1219 East Washington Avenue, Madison, Wisconsin. Ask for "Care and Operation Poster No. 1." State quantity desired.

# The Maintenance of Battery-Powered Industrial Trucks

By F. L. SAHLMANN

Transportation Department, General Electric Company

**T**HE battery-powered industrial truck, possibly because of its ability to operate longer without proper maintenance than most similar equipment, is frequently neglected to the point where its normal span of use-

fulness is seriously impaired before it is finally inspected and overhauled. Today such negligence is inexcusable since during no previous emergency in the country's history have conditions necessitated such rigid main-

tenance of industrial equipment as now.

Regular inspection and overhauling are the only positive guarantees of the continuous, efficient performance demanded by the 24-hour-a-day, 7-day-a-week production schedule now so common.

The following suggestions, therefore, are designed to facilitate the care and maintenance of the electric traction truck.

Suggest  
Traction

1. Regularly inspect the truck while servicing the motor.
2. Regularly inspect the truck while servicing the motor.



Adjusting Brush While Servicing Tilt Motor

# Tilt Motor Removed for Inspection and Servicing

end of this impor-  
tant piece of  
equipment:

## General Precautions

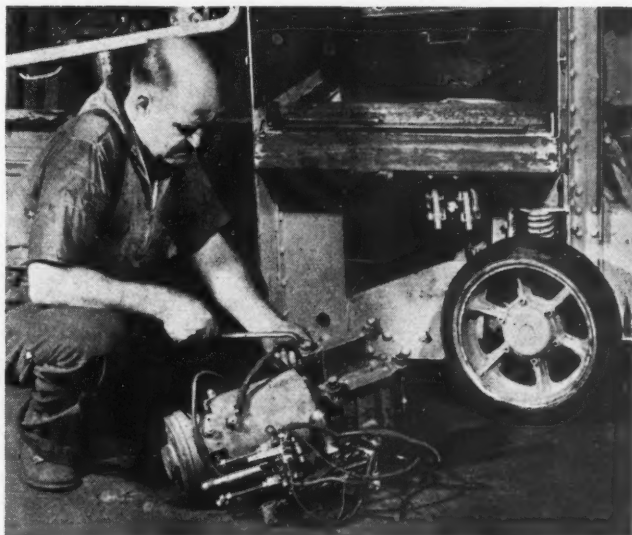
The batteries should be inspected and serviced at regular intervals according to the recommendations of the battery manufacturers, and replacement made without delay. Both the traction motor, which propels the truck, and the hoist motor, which drives the pump on trucks equipped with hydraulically-operated hoist and tilt mechanisms, or the gear box on gear or chain drive hoist and tilt mechanisms, should be inspected monthly and overhauled approximately once a year.

The controller, the commutator, the contactor, the accelerating resistor and all allied parts should also be inspected and overhauled at like intervals. Naturally, local conditions and the skill of the operator will dictate the frequency of inspection and overhauling.

Suggested procedures follow:

### Traction Motor—Monthly Inspection

1. Remove dirt from commutator cover and surrounding parts to prevent the dirt from falling into the motor.
2. Remove commutator cover and examine mechanism, noting that copper surface has a smooth pol-



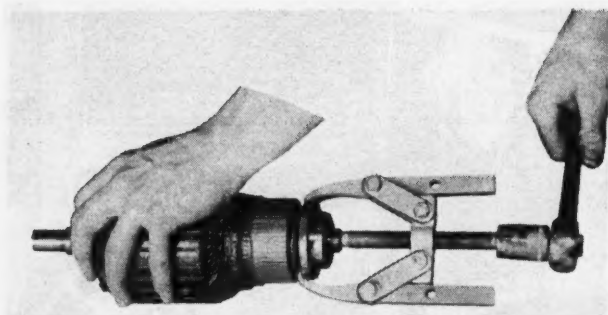
ished appearance and is free of copper beads and grease.

3. See that the brush-holder mechanisms seat on brushes and that shunts and terminals are tight.
4. Wipe carbon dust from cables and brush holders.
5. Remove dirt from brushes by lifting springs and raising and lowering brushes in the carbon ways. Do not snap the springs, as this may chip the brushes.
6. Replace short or broken brushes with new ones of the proper grade. If only partial replacement is made, grind new brushes to same length as other brushes.
7. Inspect connections for tightness.
8. Examine interior of motor for charred or broken insulation or other injuries and replace damaged parts.
9. Replace commutator cover.

### Traction Motor—Annual Overhauling

1. Remove motor from truck and



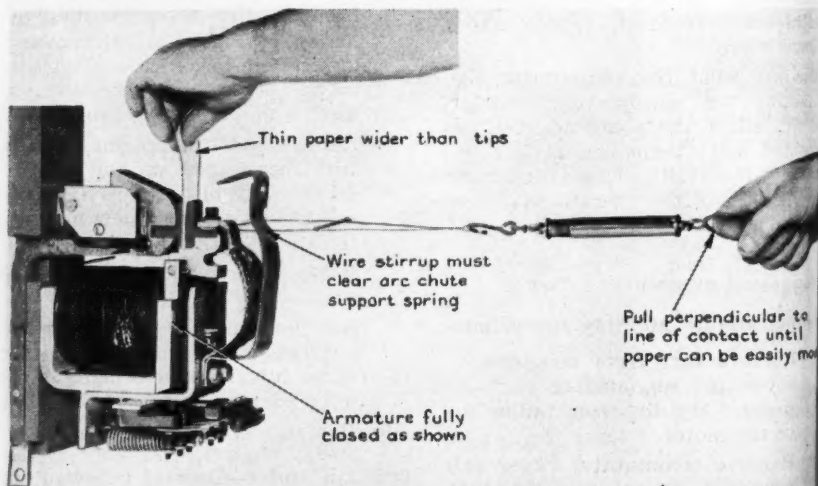


Side View of Armature Showing Front End Bearing Being Removed With Hook Type Puller

- clean the outside.
2. Remove commutator cover and raise brushes from commutator to avoid damaging them.
3. Remove nuts from studs at pinion end of motor and withdraw armature complete with commutator-end bearing assembly and pinion end framehead assembly through pinion end.

**Important:** To obtain maximum life from bearings, they must be kept free of dirt. Therefore, when bearing assemblies are removed from motor, keep them covered.

4. Remove pinion end framehead assembly and commutator-end bearing assembly from armature, employing suitable puller.
5. Blow out dust and dirt from armature, using clean, DRY compressed air and wipe clean of oil and grease with a cloth saturated with carbon tetrachloride.
6. If armature is found in good condition, proceed as follows:
7. Bake at least 12 hours at 120° (250 F.).
8. While hot, paint with a varnish such as Glyptal No. 1201. Paint string beads but take care to keep commutator clean.
9. Bake for twelve hours at 120° (250 F.).



Measuring Contact-Tip Pressure on Magnetic Contactor

# SHARPEN TOOLS

# Correctly!



## CORRECT SHARPENING IS THE FIRST ESSENTIAL FOR TOOL CONSERVATION AND HIGH PRODUCTION

- Bent or bowed arbors cause cutter runout, reducing the efficiency of the tool.
- Use the smallest diameter cutter possible to do the job.
- Establish regular resharpening periods.
- Investigate machine conditions when breakage occurs.

Remember! There is economy in keeping tools properly sharpened. They will cut faster, last longer, use less power and produce more accurate work with superior finish than if used when in dull condition.

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MANUFACTURERS OF METAL  
501 N. Keeler Avenue, Chicago, Illinois

CUTTING TOOLS AND SHAKEPROOF PRODUCTS

In Canada: Canada Illinois Tools, Ltd., Toronto, Ont.

(Note: If it is found necessary to remove armature coils due to grounds, short circuits, or other damage, it is recommended that the complete armature be sent to the nearest service shop for repairs and rewinding.)

10. Take out cap screws at commu-

through end of frame and slide coil off pole. Keep each pole coil and any accompanying shims together. Upon reassembly, parts should be returned to their original positions. Use lock washers with pole-piece cap screws, making sure the

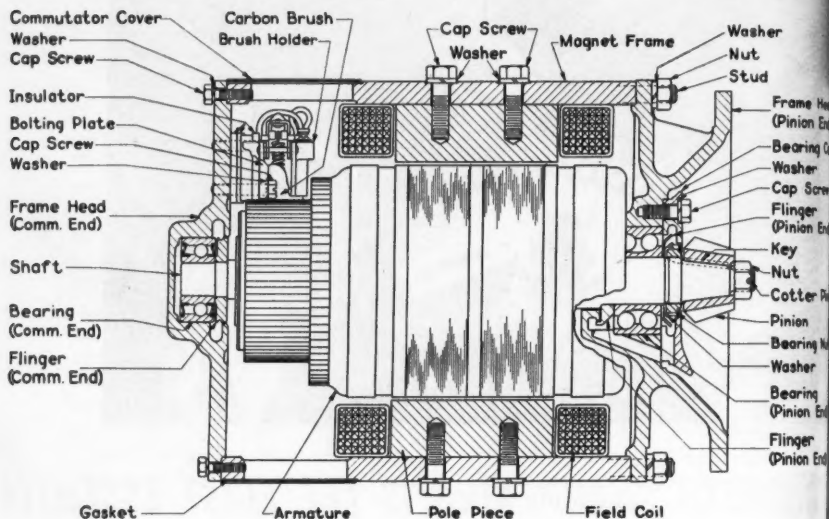


FIG. 2 SECTIONAL VIEW GE-1226-A MOTOR.

#### Sectional View of Traction Motor

tator end and remove frame-head.

11. Blow out interior of motor with clean, DRY compressed air and wipe clean of any oil and grease with carbon tetrachloride.
12. If field coils are tight and in good condition, paint them with varnish such as Glyptal No. 1201. Also, paint interior of motor with varnish, using care not to get any varnish on the pole-piece faces. Otherwise, remove field coil as follows: Disconnect cables and remove cap screws holding field piece to frame. Then slide out pole and coil

contact surfaces are clean and that cables are properly reconnected and cap screws drawn up tightly. Check coil polarity. Guard against loose connections at all times.

13. Remove dust and dirt from brush holders and cables with carbon tetrachloride.
14. Note that brush-holder mechanisms operate properly; that brushes are free in carbon ways, that shunts and terminals are tight and that carbon ways are not rough or worn. Brushes should never be allowed to wear so short that the pressure arm

I'm on my way  
**SOONER—**

*because*



## TRU-LINE TOOLS dress centerless grinding wheels with amazing speed and accuracy!

Shot, shell and projectile forms are rolling off production lines much faster these days because Tru-Line Tools eliminate all the defects and delays incidental to using single diamond wheel dressing tools.

Once positioned to the wheel the Tru-Line Tool needs no resetting, no turning and no changing until the diamonds are completely used.

The desired wheel form is easily obtained with absolute accuracy and, because every dressing is right the first time, there is great saving in down-time. The wheel

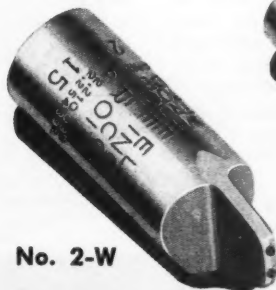
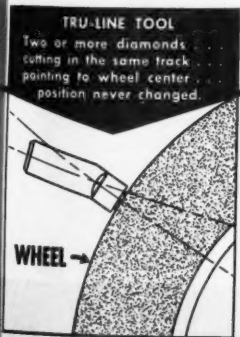
is cleaner and freer-cutting and produces many more uniform pieces between grindings.

Savings in wheel cost may be 50% because fewer dressings are needed and fewer passes per dressing.

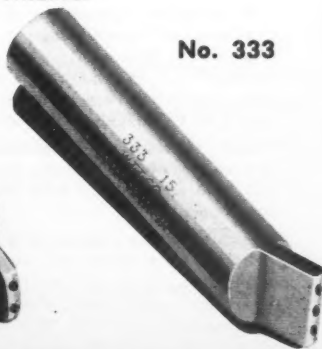
Tru-Line Tools are available for fast production of all shot, shell, and projectile forms that are centerless ground.

Send for illustrated folder describing the revolutionary, patented Tru-Line Principle, and engineering data sheets.

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# WHEEL TRUEING TOOL COMPANY

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Established 1910

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WITH EXTRA RESERVES OF  
POWER FOR EMERGENCIES . . .**

# **Use EMERGENCY motor power now!**



In peacetime, motors are applied with a substantial reserve safety factor. In other words, most applications are "overmotored" . . . the motors are capable of producing more horsepower than is required by the machines they drive.

Such "overmotoring" provides a reserve to take care of unexpectedly heavy loads, and assures long life with low maintenance cost.

But today, our problem is to "make the most of what we've got"—to get more production out of each and every motor.

Recognizing this fact, Westinghouse, at the suggestion of the War Production Board, now recommends that motor users modify their peacetime practices . . . that they get the most out of every motor they

have . . . that in applying new motors or relocating old ones, they take advantage of all possible favorable operating conditions . . . that they load each motor to the limit.

A summary of these recommendations is presented in the booklet "Calling All Horsepower," illustrated above. Ask today for your free copy. Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., Dept. 7-N.

J-21250

# **Westinghouse M**

THE WESTINGHOUSE "CALLING ALL HORSEPOWER" PROGRAM IS DESIGNED TO:

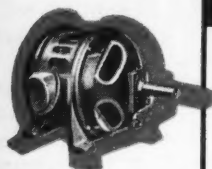
- Get maximum production out of every motor.
- Save critical materials.

The program has as its basis close teamwork between industry and Westinghouse engineers, aimed at determining with maximum accuracy the exact horsepower required by the driven machine.

In keeping with these findings, it then

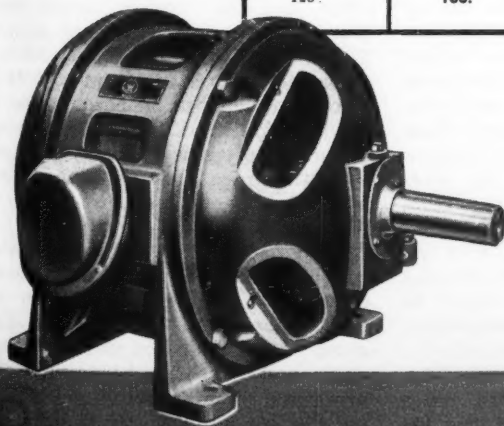
offers specific recommendations which will enable users to take advantage of (1) all favorable operating conditions; (2) extra service factors built into Westinghouse motors. Some typical results possible with this program are shown in the table below.

**OPEN TYPE  
A. C. MOTORS**



40°C rated, in applications seldom reaching or exceeding this temperature.

<i>for</i> THIS LOAD	<i>use</i> THIS RATING	<i>instead of</i> THIS RATING	<i>save these</i> MATERIALS
hp	hp	hp	lbs.
1.25	1.	1.5	36
1.88	1.5	2.	14
3.75	3.	5.	19
6.25	5.	7.5	63
9.38	7.5	10.	80
25 0	20.	25	106
37.5	30.	40.	186
62.5	50.	60	320
125.	100.	125.	550

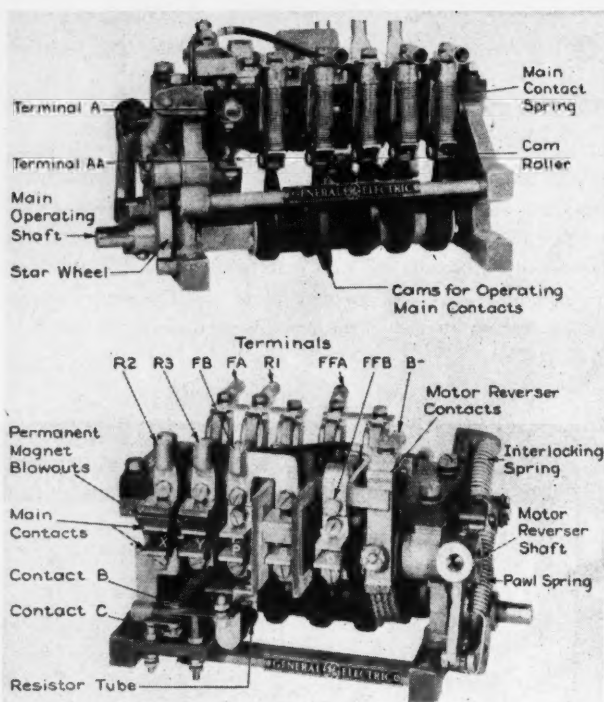


**STANDARD WESTINGHOUSE  
MOTORS ARE GENERALLY  
AVAILABLE FOR PROMPT  
DELIVERY FOR WAR JOBS**

**Motors and Control**







Views of Motor Controller and Reverser

of the lever rests on the top of the brush-holder carbon way instead of on top of the brush. All brushes must be of same length to obtain an even distribution of current. (Note: New brushes may be fitted to commutator brush holder by placing a strip of fine sandpaper between end of brush and commutator with the rough side of the sandpaper against the brush.)

15. Pole-piece cap screws must be tight and locked with lock washers.
16. Reassemble parts on armature. When replacing bearings, use a suitable brass sleeve so that the pressure will be on the inner race of the bearings.

lathe and the copper turned down just enough to give a true surface. The mica between the copper commutator segments is undercut to  $3/64$  in. below the copper brush surface on new commutators and should be undercut as often as necessary to prevent the mica from becoming flush with the copper brush surface. Slightly round all sharp edges on the copper segments after turning or undercutting and remove all chips, sharp edges and copper dust from the grooves between the segments. Care must be taken to prevent the copper chips and dust from lodging in the armature winding while reconditioning the commutator, by using a suitable head covering over the armature windings.

17. Reassemble armature in frame putting in new brushes if necessary.

### The Commutator

The commutator should never be lubricated, since the brushes contain sufficient lubrication. A dirty and greasy commutator will collect carbon dust in the grooves between the segments. This condition will cause a short circuit. The commutator should be kept smooth and concentric with the armature bearings. If the commutator brush surface is rough, burned, pitted or excessively worn, the armature should be placed in a

PRO  
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# HOW TO KEEP YOUR PNEUMATIC TOOLS *on the Job*



**PROPER LUBRICATION IS MOST IMPORTANT.** Each morning, and at noontime, the operator should inject a few drops of Cleco "Never-Gum" oil, or other high-grade light machine oil, into the hose connection, unless an efficient air line lubricator is being used. Under conditions of continuous operation, the tool should have a few drops of oil every hour. *Caution:* If too much oil is used, or too heavy a grade, the tool will be sluggish.



Because of priorities and manufacturing uncertainties, it is important to get the maximum work out of your tools with a minimum of expense for repairs and compressed air. Forty years' experience manufacturing pneumatic tools enables us to make many practical suggestions

for bettering tool performance. We are featuring these suggestions in a series of advertisements in cartoon style. The whole series of "Cleco Cartoons," in pamphlet form, will be gladly mailed to pneumatic tool users. Write soon, the edition is limited.

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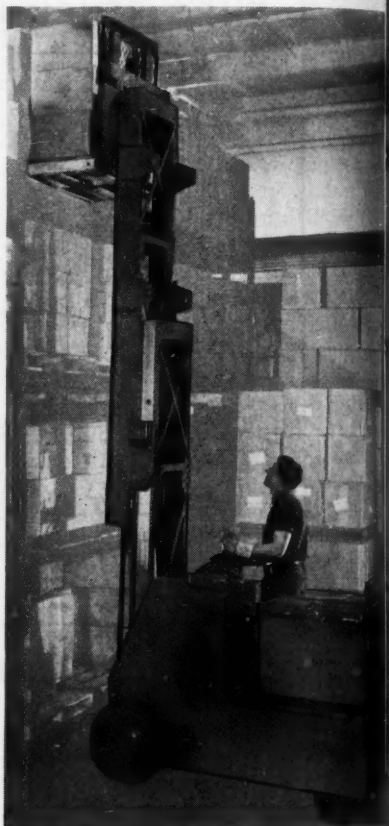
1034 Niagara St.  
Buffalo, N. Y.



with  
**CLING-SURFACE**  
*Belt Treatment*

### Pump Motor—Inspection and Overhauling

The same procedure suggested for the inspection and overhauling of the traction motor should be followed in the case of an industrial truck equip-



Truck Equipped with Form Making 15-Foot L

ped with a motor-driven gear-and-chain or hydraulically operated hoist and tilt mechanism, except for the differences in the method by which the motor is removed or opened.

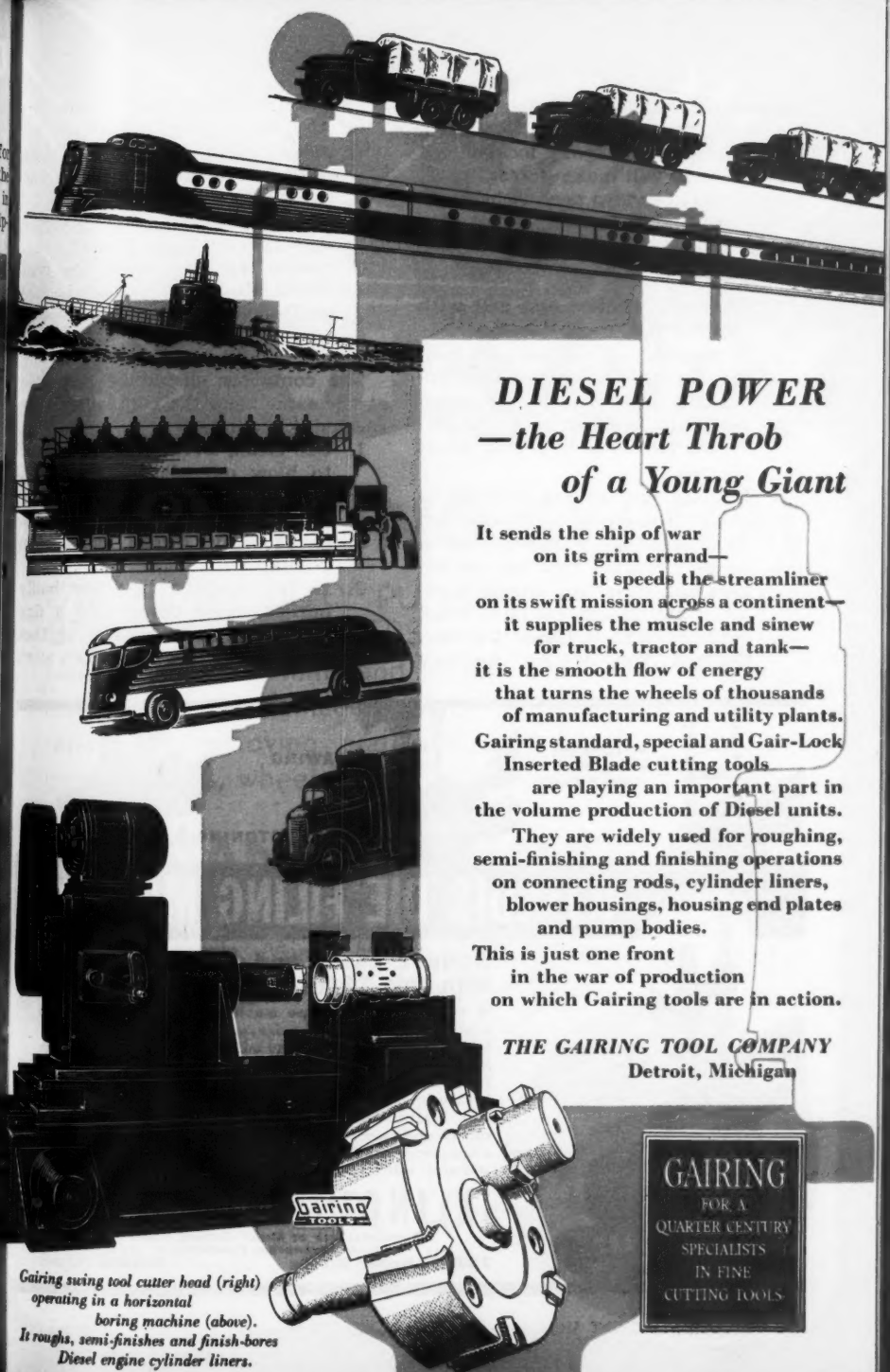
Details vary according to the particular type of truck involved, but in general it is necessary to first dis-

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## **DIESEL POWER** *—the Heart Throb of a Young Giant*

It sends the ship of war  
on its grim errand—  
it speeds the streamliner  
on its swift mission across a continent—  
it supplies the muscle and sinew  
for truck, tractor and tank—  
it is the smooth flow of energy  
that turns the wheels of thousands  
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Gairing standard, special and Gair-Lock  
Inserted Blade cutting tools  
are playing an important part in  
the volume production of Diesel units.

They are widely used for roughing,  
semi-finishing and finishing operations  
on connecting rods, cylinder liners,  
blower housings, housing end plates  
and pump bodies.

This is just one front  
in the war of production  
in which Gairing tools are in action.

**THE GAIRING TOOL COMPANY**  
Detroit, Michigan

Gairing swing tool cutter head (right)  
operating in a horizontal  
boring machine (above).  
It roughs, semi-finishes and finish-bores  
Diesel engine cylinder liners.

**GAIRING**  
FOR A  
QUARTER CENTURY  
SPECIALISTS  
IN FINE  
CUTTING TOOLS

connect the coupling between the motor and the pump. The mounting screws may be differently located, but an inspection will make it readily apparent what changes need to be made in the routine as already mentioned in connection with the traction motor.

### The Controller

1. Blow out all dust and grit with clean, DRY, compressed air.
2. If required, oil contact cam rollers through holes provided insulating support and oil reverser-shaft bearing. Use an accepted lubricant in a long snout oil can.
3. Replace any broken springs or shunts and check all connections for cleanliness. Tighten if loose.
4. Inspect contact tips for cleanliness and wear, and carefully remove any roughness on contact surfaces with a clean, fine file. Contact tips worn halfway

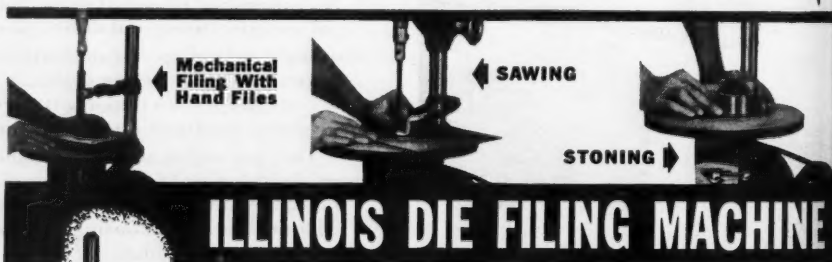
through should be replaced.

5. At yearly overhaul period, remove, clean and repack main shaft bearings with an accepted ball-bearing grease.
6. Both the contact tip pressure and the tip gap (distance between the tips when the contactor is open) should be checked periodically.

### Contactors

The contactor should be inspected at the same time the controller is inspected, as follows:

1. Use clean, DRY, compressed air to blow out all dust and grit, being sure to blow out all metallic dust from contact points.
2. Replace any worn or broken points.
3. If the contact tips are badly burned, dress down with a fine file. (Do not waste contact metal.) Replace tips when worn



## ILLINOIS DIE FILING MACHINE

### Reduce costs and improve quality with this TRIPLE-PURPOSE Machine

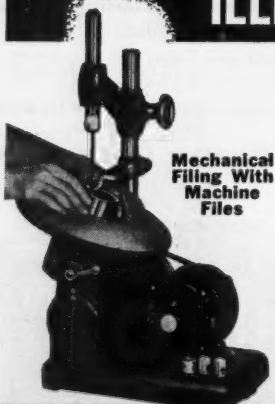
A versatile bench type machine for all three major production steps in the die-making process—sawing, filing and stoning. Quality built throughout to stand up longer and produce more accurate work. Forced-feed lubrication plus hardened and ground shafts running in bronze bushings combine to minimize wear and prolong life. Maintained accuracy is secured through holding chuck and clamping device which provide positive file alignment, and balanced moving parts which operate without vibration. Write for descriptive literature.

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OTC HEAVY DUTY PUSH PULLERS and OTC GRIPOMATIC PULLERS are helping War Production in factories, mills and mines. They save precious machinery from damage, reduce injury risks and speed repairs in removing and replacing bearings, pulleys, gears, shafts, wheels, etc. Capacities 5 to 50 TONS.

## **OTC GIANT WRENCHES** meet a vital need for Marine Engines, Diesel Motors, Generators, Pumps, Steam Shovels, Mine, Mill and R. R. machinery. Made to order, of sturdy alloy steel.

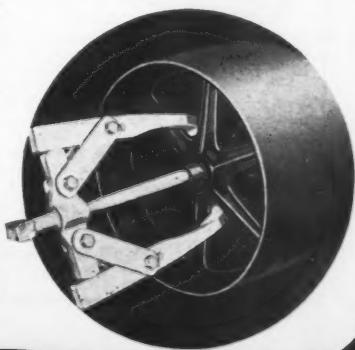
OTC Heavy Duty BOX WRENCHES in 3 handle types, 24 sizes -  $\frac{7}{8}$ " to  $3\frac{1}{8}$ " opening.

*Write*

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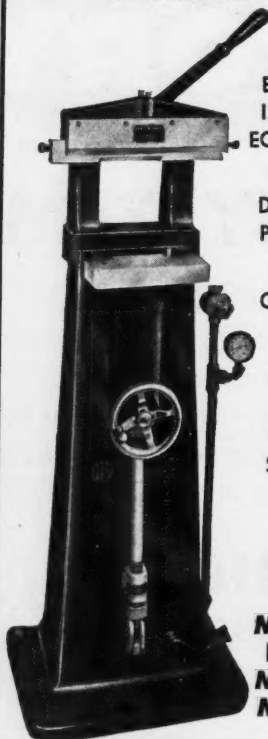
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OWATONNA, MINN.





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ALWAYS  
**IDENTIFIED**  
IF PERMANENTLY  
**MARKED**  
IN THIS MACHINE



MARKING  
BY ROLLING  
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This machine operates from your plant air line, and is one of numerous models built to produce fast, neat marking on metal parts. Hi-Duty marking machines may be had for practically any marking operation, and we will be glad to make recommendations upon receipt of your inquiries. Send prints or samples of parts to be marked, showing lettering and location, also state required production.

**GEO. T. SCHMIDT, Inc.**

1806 BELLE PLAINE AVE.  
CHICAGO, ILLINOIS

halfway through.

4. Inspect cable and shunt connections for loose or faulty electrical contact.
  5. Periodically check contact tip pressure and tip gap.
- Note: Specific information relative to coil operation and contactor adjustment should be obtained from the manufacturer.

#### Accelerating Resistor

1. Blow out dust and dirt with clean, DRY, compressed air and check all connections for tightness.
2. Check both resistor ribbon and porcelain insulator for damage or breakage.

From the foregoing, then, it is obvious that proper maintenance of this important piece of industrial equipment—maintenance that will largely eliminate expensive breakdowns and replacements—is based solely on the common-sense theory of preventing trouble before it starts.

**Cincinnati Press Brakes.** A 64-page profusely illustrated, plastic bound catalog on press brakes has been prepared by The Cincinnati Shaper Co., Cincinnati, Ohio. The catalog is largely devoted to illustrations showing press brake applications, bending and punching load charts, features for special work, and pages of dies and their uses. Copy free to mechanical executives addressing a request on their company letterhead.

**"Producing for Victory,"** a 64-page labor manual for increasing war production, is now available from the War Production Department, Federation of Architects, Engineers, Chemists and Technicians—C.I.O., 5 Beekman Street, New York, N. Y. The booklet is a compilation of the best practices in modern industrial management and has been written around the experiences and the most pressing problems of workers and unions in the nation's war industries.

Copies of "Producing for Victory" can be obtained at a price of 15 cents each.

# 3 MINUTES 10 SECONDS TO REAM 25 HOLES



**15/16" HOLES REAMED IN  
TWO 3/4" SHIP PLATES**

**CP Hicycle Cuts Reaming Time**

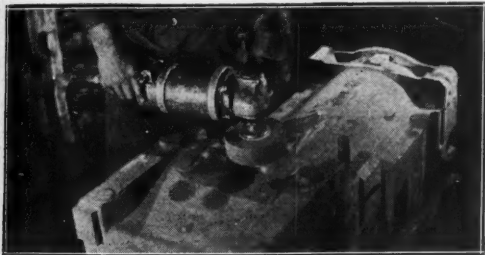
PHILADELPHIA (CP)—Just 190 seconds were needed to ream 25 holes, 15/16" diameter, through an inch-and-a-half of metal in two 3/4" ship plates, in a shipyard using CP Hicycle Electric Reamers.

The CP Hicycle line includes Reamers, Drills, Screw Drivers, Nut Runners, Tappers, Grinders, Sanders. All have highest sustained speeds and lowest maintenance costs of any portable tools. Write for complete data.

**↑ 25 15/16" HOLES** through 1 1/2" of steel plate in 3 min., 10 sec., thanks to high sustained speed and rugged construction of CP Hicycle Reamers.

**CHICAGO PNEUMATIC  
TOOL COMPANY**

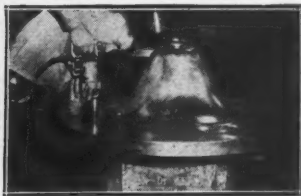
General Offices: 8 E. 44th St., New York, N. Y.



**← 19" ARMOR PLATE CHIP** from 1-9/32" hole drilled through 2 1/2" plate in 4 1/2 minutes. Length of the chip shows the lack of vibration and high sustained speed, characteristic of all CP Hicycle Electric Tools.

**↑ ONE OF FIVE MODELS** of Hicycle Electric Angle Grinders and Sanders. Because of the uniform speed of Hicycles, grinding wheels last longer.

**↑ 1/4" HOLES IN 5/8"** steel castings, an easy job for this CP Hicycle Electric Drill. Hicycles are designed for continuous, heavy duty.



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and UNIVERSAL**  
Drills  
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Grinders  
Sanders

# *No gear too large.... No gear too small...*

Any gear from  $\frac{1}{4}$  inch to many feet in diameter can now be finished on a "Michigan" crossed axis gear finisher. There is a machine to suit practically any combination of production quantities and external or internal spur or helical gear sizes.

*Ask for Bulletins by  
Model Number*

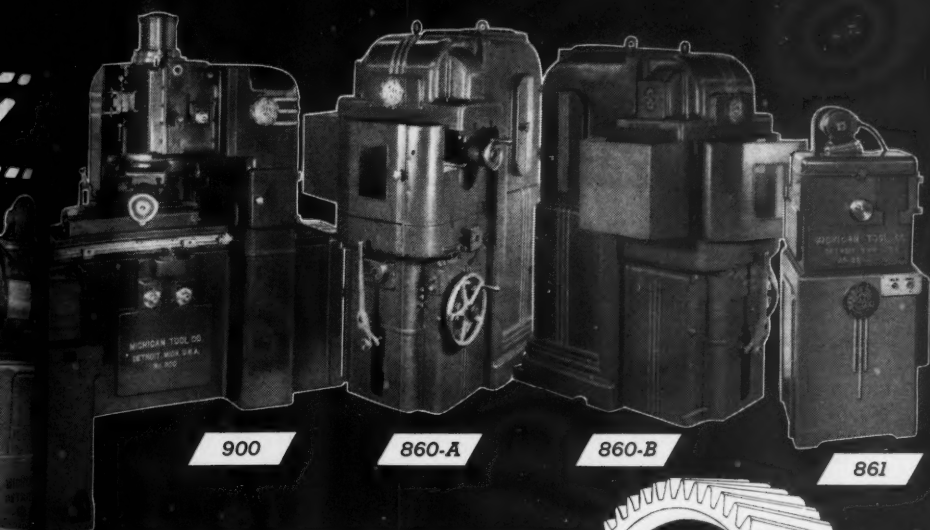
862-18

862-24

865-36

865-48

MICHIGAN TOOL CO.  
DETROIT, MICH. U.S.A.  
N. EST. - 48 A



**MACHINE  
MODEL NO.**

**GEAR CAPACITY  
(diameter)**

861-4B (Light Duty)	$\frac{1}{4}$ " to 4"
900 (Rack Type)	1" to 8"
860-(A or B)-8	1" to 8"
860-(A or B)-12	1" to 12"
860-(A or B)-16	1" to 16"
862-18 (Heavy Duty)	2 $\frac{1}{4}$ " to 18"
862-24 (Heavy Duty)	2 $\frac{1}{4}$ " to 24"
865-36 (Heavy Duty)	4" to 36"
865-48 (Heavy Duty)	4" to 48"

865- ??? (Heavy Duty)

for larger gear  
sizes up to 16  
feet diameter (on  
special order)

# MICHIGAN TOOL COMPANY

7171 E. McNichols Road

Detroit, U.S.A.

# War Bond Pay-Roll Drive to "Lick the Jap"

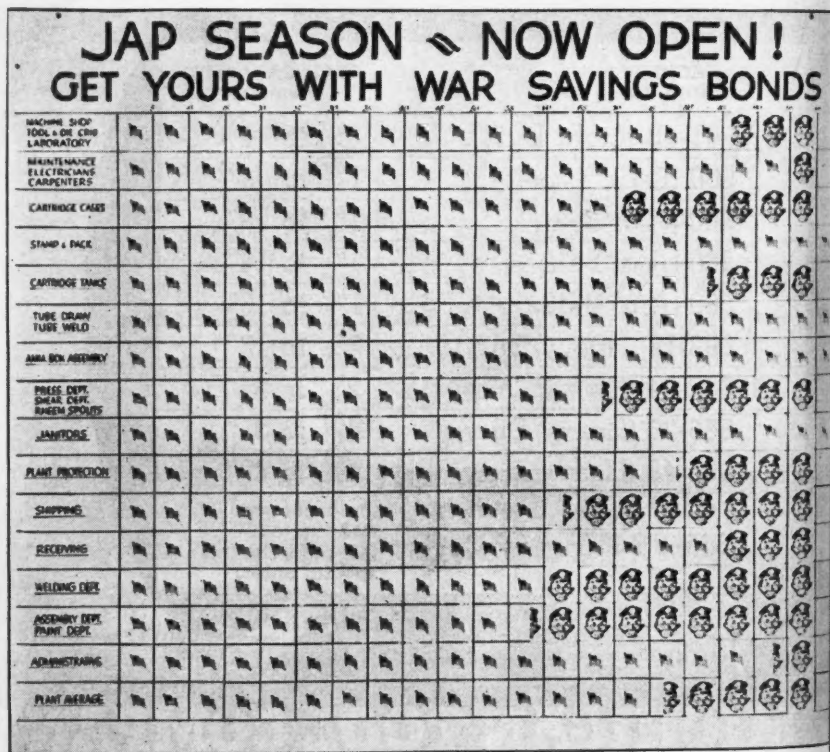
**A**N unique stunt for stimulating greater employee interest in War Bond pay-roll plan drives has been developed by the Norris Stamping and Manufacturing Co. of Los Angeles.

A glance at the accompanying illustration of the Norris "Scoreboard" which occupies a large and prominent wall space in the plant, shows

the relative standings of the various departments in their "pennant race" to the common objective—a quota of 100 per cent participation in the company's pay-roll allotment plan as advocated by the Treasury Department for employees' War Bond purchases.

The "symbol of progress" is an ugly-looking Jap with 5 detachable

### Scoreboard Showing Relative Standings of Various Plant Departments in Pay-Roll Allotment Drive



features (ears, eyes and nose), one of which is "amputated" for each percentage point of quota subscription gained by each department, as shown in the smaller cut, each of whose perforated lines represents 1 per cent and are detached as points are made.



A Strip is Torn Off for Each 1 Per Cent of Subscription to the Norris Company's Pay-Roll Allotment Plan

When each 5 percentage points are achieved, and the Jap's ugly mug entirely eliminated, it is replaced by an American flag, symbolizing that another allied victory has been won. As a department achieves its goal of 100 per cent subscription in its drive, it has 20 American flags to its credit and an added one to signify that it has gone over the top and completely wiped the Japs out of the department's path to victory.

In answer to numerous requests, Norris Stamping & Manufacturing Co. officials state that they will gladly furnish other organizations with the details of their successful contest. Norris headquarters are 5215 South Boyle Avenue, Los Angeles, Calif.



## UNIVERSAL FIRST COMPANY IN AMERICA TO WIN COVETED 20% BOND FLAG

When each of the 550 of us here at Universal helped give the Allied cause a boost by being America's first industrial plant to subscribe 20% for War Bonds we were mighty proud.

But we're even more proud of the big volume of precision built drill bushings we're turning out daily to help America's arms production.

Universal drill bushings (such as the one shown here) are straight and round with superfinished bores which assure accuracy and unexcelled wearing qualities. Write for facts.

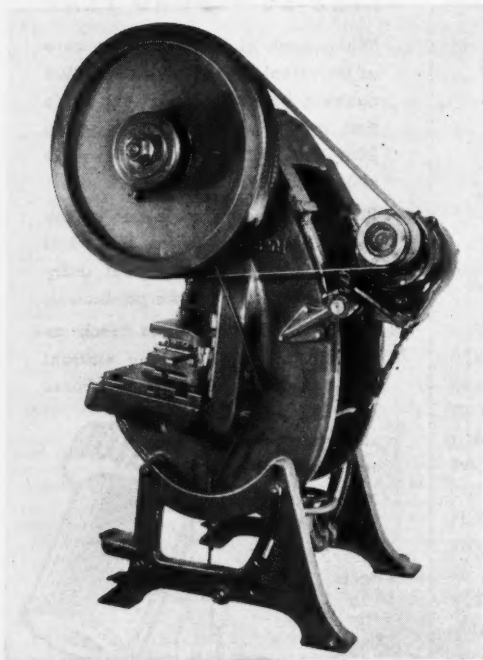


# UNIVERSAL

ENGINEERING COMPANY  
FRANKENMUTH, MICH.



# Put more PUNCH in your PRESSES with MASTERDRIVES



On punch presses, MASTERDRIVES have high torque, high slip motors to pick up the load without shock. Gear head motors reduce output shaft speed and permit using large pulleys. Automatic belt tensioning device permits preloading belt. You use your present belting, save expense of delays of grooving pulleys or buying new belts. Belt breakage won't capsize drive. Unique upper mounting permits roll feed or die removal from back of press. MASTERDRIVES ARE COMPLETE drive units. Motor and mounting are engineered, built and guaranteed as a complete installation. 550 specifications cover practically every machine tool drive requirement.



Write today for complete literature and name of your nearest Master representative.

## MASTER Electric Company

INDUSTRIAL EQUIPMENT DIVISION • DAYTON, OHIO

# Another Tribute To The Super Smooth Finish and Accuracy of **SUNNEN PRECISION HONING**

● To aid them in living up to their slogan of "It Must Be Right," the Hydraulic Press Manufacturing Company has adopted Sunnen Precision Honing.

Replacing hand reaming, the Sunnen method not only saves time, but, in addition, makes possible close tolerances and a super-smooth finish.

## You, Too, Can Profit by These Advantages—

If you are reaming or grinding internal cylindrical surfaces from .185" to 2.400" in diameter, this practical, inexpensive, accurate machine will help you speed up production, cut costs, and improve accuracy.

The Sunnen Precision Honing Machine does not require skilled labor—workers in "teens" can handle jobs in "tenths." Can be set up and work located in less than a minute. Accuracy within .0001" guaranteed. Corrects errors of out-of-roundness or taper caused by previous operations. Relieves big internal grinders for other jobs. Doesn't need fixtures—work is held in hand by operator. Provides simple, low-cost method for duplicating sizes.

Put Sunnen Precision Honing to work in your plant.

## SUNNEN PRODUCTS COMPANY

7933 Manchester Avenue

St. Louis, Missouri

Canadian Factory: Chatham, Ontario

**SUNNEN**

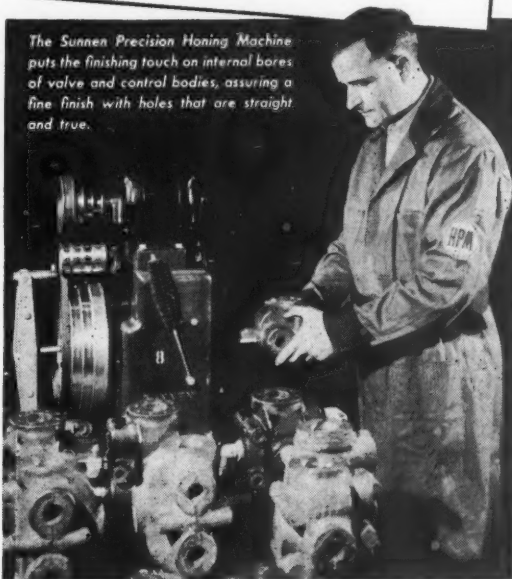
## Send for FREE BULLETIN

—giving complete information. Or, if you prefer, a Sunnen Sales Engineer will demonstrate this equipment in your plant on your job.

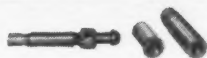
To insure interchangeability of parts, we use Sunnen honing on our HYDRO-POWER Valves and Control Bodies.

— The Hydraulic Press Manufacturing Co.

The Sunnen Precision Honing Machine puts the finishing touch on internal bores of valve and control bodies, assuring a fine finish with holes that are straight and true.



Aviation Hydraulic Cylinder made of Aluminum Alloy. Improves the quality of the bearing surface. An extremely smooth surface finish is secured.



Airplane Engine Parts accurately honed to a super-smooth finish.



Bronze Valve. The Sunnen method of honing is used to secure a high finish and accuracy.



Aircraft Valve Tappet Roller. 4-Micro Finish.



Diesel Engine Fuel Injector Cylinder "So accurate that a piston can be fit within .00005 in."





# Modern Plant for Suprex Gage Company

**S**YMBOLIC of American determination to swamp the Axis powers with a burst of materials and men is the newly-completed \$750,000 expansion program of the Suprex Gage Company, Ferndale, Michigan. Only fourteen months old, this company now occupies one of the country's largest and best-equipped plants for the production of precision gages.

The company moved into its new, modern plant in July of this year, and is now, according to Mr. N. A. Woodworth, President, in peak production and quadrupling its last year's production record. Mr. Woodworth predicts that within the next few weeks certain types of gages will be sufficiently stocked to provide 48-hour emer-

gency service to war plants. Usually several weeks is required to fill a precision gage order.

All of the departments of the Suprex Gage Company are housed under one roof, in a modern "daylight" building

especially designed for the manufacture of precision gages. The machine tool and plant equipment inventory is balanced to meet the requirements of a carefully-planned production schedule, and each machine has been selected with a view to quality and the nature of the task that will be expected of it.

All operating equipment is insulated against noise and vibration, not only to ensure accuracy in the production of gages to extremely close limits but to also ensure an atmos-



**N. A. WOODWORTH**  
President, Suprex Gage Company

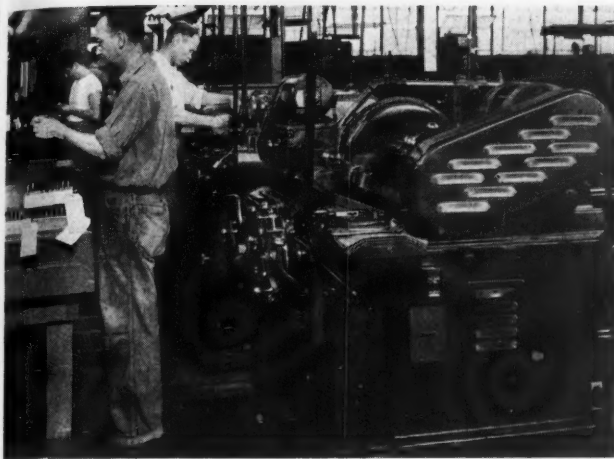
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This Grinder, at the Suprex Gage Company's Plant, is Capable of Working Within a Tolerance of 0.00005 Inch. Each Machine in the Plant is Selected for a Definite Precision Job

based on the proposed production of the shop, taking into consideration the production expected on the various types of gages and the several and

phere of quiet efficiency which will make possible the highest type of workmanship. Modern lighting of the fluorescent type floods the plant with "daylight" lighting which aids in manufacturing and inspection operations.

One of the interesting features of the plant is the final finishing and inspection in the "temperature control" room where a constant temperature of 68 to 70 degrees is maintained, winter and summer. In this room various gages, including, plain ring, plain plug, thread ring, thread plug, and flat gages are finish lapped to limits as close as 20 millionths (0.00002) in.

The heat treat department has been set up to meet a production schedule

various kinds and types of treating operations to be performed. Nothing is left to chance; each piece of equipment is definitely controlled both so that the maximum of results can be obtained and so that the operations can be duplicated indefinitely without variation



This Suprex Workman is Splitting Thread Ring Gages, Using a New Adaptation of the Metal Sawing Machine



Partial View of the Temperature Control Room at Suprex Gage. In This Section Various Types of Gages are Finish-Lapped as Close as 20 Millionths of an Inch. The Temperature in This Room is Constantly Maintained at 68 to 70 Degrees Fahrenheit

in the quality of the product. Equipment and facilities are also provided for the production of chrome-plated gages.

For inspection purposes the very latest in optical and precision instruments has been the goal. High-power

instruments are used to check the gage surfaces for flaws, the leads of thread gages, and so on. Comparators are used to check the angles and shapes of threads, clearances, and other important parts of gages of all kinds.

In commenting upon the completion of the Suprex Gage plant, Mr. Woodward made a point of the importance of the gage industry in the war effort.

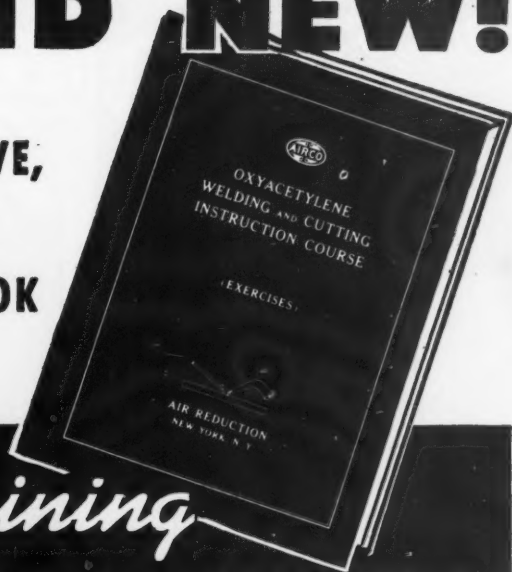
"There could be no interchangeability of parts for guns and mechanized equipment if the American gage industry were not what it is today. The importance of standard pre-



Using a Precision Lead Checking Instrument to Check the Lead of the Thread on a Thread Gage

# BRAND NEW!

A COMPREHENSIVE,  
UP-TO-DATE  
INSTRUCTION BOOK



## *For Training* **OXYACETYLENE WELDING and CUTTING OPERATORS**

This book starts at rock bottom — instructs the beginner on set-up of apparatus. It describes welding fundamentals — methods, torch and rod positions and manipulation . . . procedure for welding, braze welding and low temperature brazing. Lessons cover steel, pipe, sheet metal, cast iron, brass, copper and aluminum.

Without question, this Airco Oxyacetylene Welding and Cutting Instruction Book will prove an invaluable aid to quickly train oxyacetylene torch operators to meet today's needs. \$1.00 per copy, quantity prices on request.

## **Air Reduction**

General Offices: 60 E. 42nd ST., NEW YORK, N. Y.  
IN TEXAS

MAGNOLIA-AIRCO GAS PRODUCTS CO.

General Offices: HOUSTON, TEXAS

OFFICES IN ALL PRINCIPAL CITIES



**OXYGEN IS PRODUCTION — Don't Waste it!**



*Specify*

**GRIFFIN**

*Hack Saw Blades*

● Get the utmost in cutting production! There's one way to be sure . . . specify and demand GRIFFIN. "There's a GRIFFIN BLADE for every metal cutting job."



Made by G. W. GRIFFIN CO., Franklin, N. H.

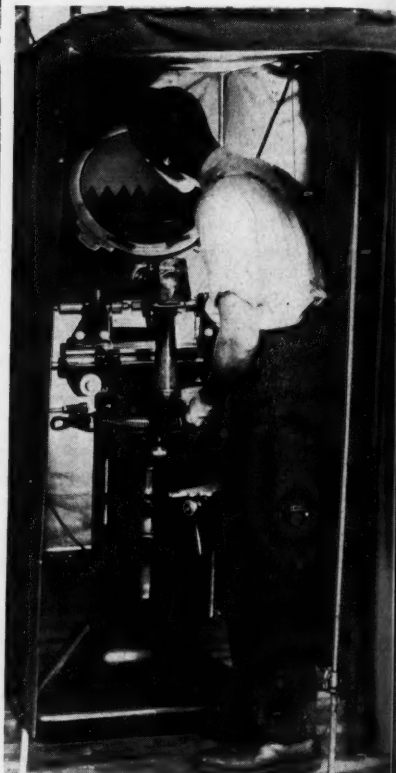
**JOHN H. GRAHAM & CO., INC.**

General Sales Agent

105 DUANE ST.

NEW YORK CITY

cision gages in the manufacture of fighting equipment was discovered during World War I when it was found that many repair parts intended for equipment that had been damaged on the battlefield were useless. They wouldn't fit because they had been



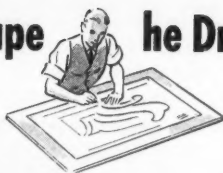
Using a Comparator in a Canvas "Darkroom" to Check the Accuracy of the Angle and Shape of the Thread and Root Clearance on a Precision Thread Gage. The Comparator Multiplies Inaccuracies Many Times, and thus Ensures Accuracy Far Beyond Normal Visibility

made to meet requirements established by gages which were not identical.

"This failure in American manufacturing practice could be charged to lack of universal standards, lack of temperature control in the production

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Any Shape he Draws



A UNISHEAR can Follow!



... and cut it  
**FASTER**  
than any other tool!

Wherever sheet metal departments are "beating the promise", you'll find Stanley Unishears on the job. They slice through sheets as fast as you feed, up to 15 feet per minute - follow any line accurately, straight, curved or angle - leave smooth, clean edges with no distortion. Plenty of power and ruggedness for tough production or maintenance use.

Portable models with capacities up to 12 U. S. gauge hot rolled steel. Stationary models to handle sheet metal up to 10 gauge. Stanley Electric Tool Division, The Stanley Works, 137 Elm St., New Britain, Connecticut.



TOOLS ARE THE WORKER'S WEAPONS  
IN A TOTAL WAR. KEEP THEM ON  
THE JOB WITH PROPER CARE....

**STANLEY UNISHEARS**

The Electrically Driven Hand Shears

and inspection of precision gages, and other factors. So great was the need for uniformity and standardization of measurements that, at the conclusion of the war, a group of manufacturers convened with government engineers to establish a definite standard. Today parts for guns, airplanes, tanks and other battle equipment are checked with standard precision gages so that ordnance repair or replacement parts, whether sent to Australia, Africa, Europe, or the Aleutians Islands, are interchangeable.

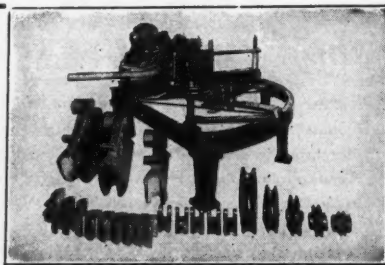
"Today's gages also make it possible to train inexperienced men and women, quickly and easily, in the inspection of vital parts for mechanized equipment. Even as late as ten years ago, crude instruments which left much to the calculating ability of the inspectors were used, but today precision gages are dependable for constant accuracy and durability."

The Suprex Gage Company is work-

ing toward the objective of building up a stock of precision gages in certain types and sizes so that emergency orders from war materiel manufacturers can be filled immediately.

"Make 3 Do the Work of 4" is the title of a 14-page bulletin on welding electrode conservation which has been issued by Air Reduction Sales Co., 60 E. 42nd St., New York, N. Y. The bulletin includes a series of six shop posters designed to help arc welding operators do more useful work with every electrode. Each poster illustrates a common wasteful practice, then shows the corresponding good practice and points out the ease and simplicity of doing the job the correct way. Posters are bound tightly in the bulletin yet are perforated so that they can be easily detached and fastened on shop bulletin boards. Copy of bulletin free upon request.

Do your share to preserve the American way of life. Invest regularly in War Savings Bonds and Stamps.



## THE AMERICAN COLD PIPE, CONDUIT AND TUBE BENDING MACHINES

### QUICK DELIVERIES . . .

**HAND OPERATED TYPES** in capacities of 1 in., 2 in., 3 in., 4 in.  
**MOTOR OPERATED** in three capacities, 1/2 in. to 4 in., 1/2 in. to 6 in., and 1/2 in. to 8 in.

Early shipments on hand operated machines; on motor powered from four to six weeks.

Wire or air mail letter for printed matter and prices.

Three New Machines: No. 1—For bending extra heavy pipe up to 3 in. No. 2—For bending all kinds of thin gauge tubing without use of mandrel. No. 3—For bending IPS conduit.

## AMERICAN PIPE BENDING MACHINE CO., INC.

25 PEARL ST.

BOSTON, MASS., U. S. A.



**FOR NATIONAL  
DEFENSE  
We Are Ready  
To Serve You**

## IT'S THE OFFENSE THAT WINS BATTLES

Since 1940, the Nazis have won battle after battle. Why? Because they've waged one offensive after another.

**ALTER EGO:** Yes, but they've been able to do that. They started their war production offensive 10 years ago so they had a big edge on us in tanks, planes and guns. Then we really started competing.

So competition forces progress. Look how in two years, our production offensive has already surpassed that of the Axis — turning out better weapons and more of 'em. These new arc welded M-4 tanks, for example. They'll soon be in our fighting offensive.

**ALTER EGO:** It's thrilling but don't let it get us complacent. Haven't we learned never again to be caught unprepared in war . . . or in business competition either?

There you have it! Let's start TODAY waging a planning and designing offensive so we'll be on the alert with better welded products and lower costs to get the upper hand on our competition the minute the post-war Battle for Business begins!

Ask your inner self if it isn't  
the offense that wins battles

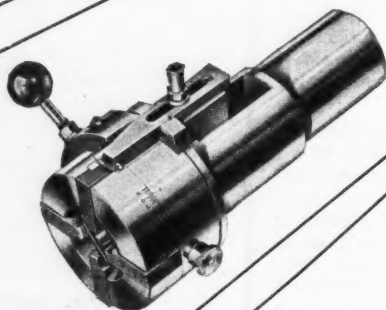
**THE LINCOLN  
ELECTRIC COMPANY**      **Cleveland, Ohio**

*then I said to myself—*

**IT'S A GREAT JOB  
— WELD DONE!**



# Taper Threads



**DO YOU  
CUT THEM?**

## **GEOMETRIC STYLE CT TAPER DIE HEAD**

Cuts Taper Threads as efficiently as  
other die heads cut straight threads.

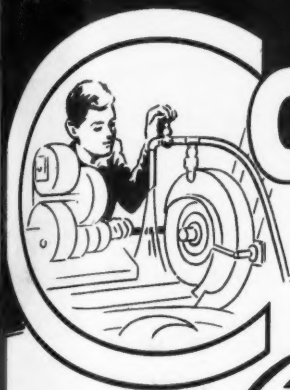
**STEEPER TAPERS  
GREATER LENGTHS  
SMOOTHER, MORE ACCURATE THREADS  
AT LOWER COST . . . . . AND  
LESS POWER REQUIRED!!!**

Chasers cut in the same manner as in cutting a straight thread.

Taper is controlled by a positive angle on the taper bar—No jam-cut threading! Tough material or any other kind—you'll get smooth, uniform taper threads all the way.

For use in hand screw machines, turret lathes and other similar equipment. Write for our Style CT booklet.

**THE GEOMETRIC TOOL COMPANY  
NEW HAVEN, CONN.**



# CONTROLLED FLOW

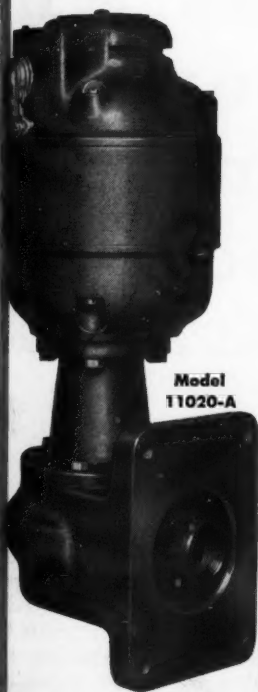
## *Saves Power*

### ~ RUTHMAN ~ **GUSHER** COOLANT PUMPS

Gusher Pumps can be throttled to any extent without building up pressure. Power consumption decreases when pump is partially or totally throttled. This feature plus the elimination of packing glands make Gusher pumps economical and most efficient. These and other exclusive features help speed your production.

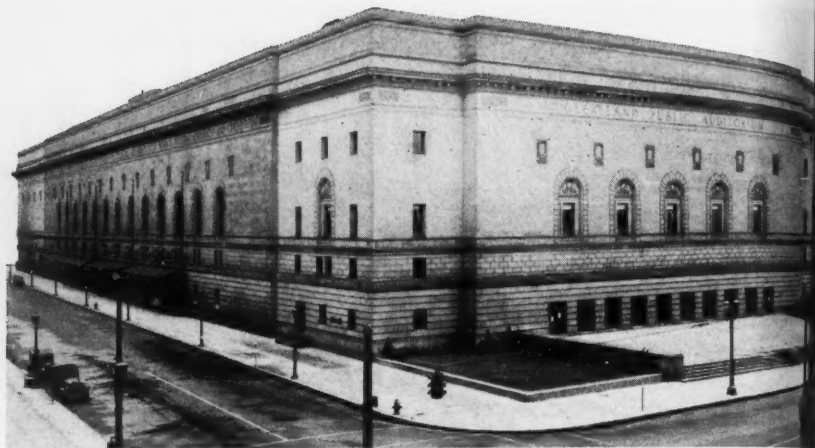
There's a Gusher Pump to fit your needs. Write for data and specifications.

One of the latest and most modern type of coolant pumps. Intake and discharge pass through flange directly into machine making a very neat and efficient installation.



**THE RUTHMAN MACHINERY CO.**  
1817 READING ROAD, CINCINNATI, OHIO  
LARGEST EXCLUSIVE BUILDERS OF COOLANT PUMPS





Cleveland Public Auditorium, Cleveland, Ohio

# Metal Congress Will Feature Increased Production of War Products

## Engineering, Technical and Production Talents To Be Mobilized in Drive For Greater Production

**P**LANs for what is said to be the greatest mobilization of engineering, technical and production talent in the metal industry are being whipped into final shape for the National Metal Congress and War Production Edition of the National Metal Exposition, to be held in Cleveland's Pub-

lic Auditorium, Cleveland, Ohio, October 12th through 16th.

This year's meeting will be far different from any held in the 24-year history of this big event, according to W. H. Eisenman, Secretary of American Society for Metals, managing director of the Exposition.

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# Suggestions for **MORE EFFECTIVE** INSPECTION PRACTICE

Establish a definite wear allowance for all sized size gages, plugs, rings, etc.

Check these gages periodically to determine when wear has eliminated this allowance.

In final inspection it is better to use an instrument than a fixed size gage when the wear allowance of the gage by the 5-10% is established at .0001" or less. Here the human factor is usually important enough to outweigh the effect of the wear allowance and gaging results become questionable.

It is ordinarily not best to use a conventional snap gage for the inspection of work requiring a manufacturing tolerance of .002" or less.

Keep plugs and rings oiled when not in use.

6 Be sure that both work and gage are clean before they are brought together.

7 Periodically check your precision gage blocks for wear, against a set of certified blocks. Redesignate them when wear is revealed.

8 In setting a comparator gage be sure that both gage and precision blocks are at the same temperature.

9 It is well to check the calibration of indicating type comparators periodically. If an error is found, it is better to send the comparator back to the factory for recalibration.

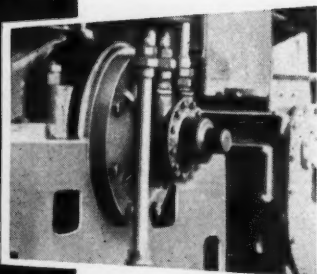
10 If you are using Multicheck gages insist on the operators handling them smoothly. Work should never be jammed violently into gaging position.



**Sheffield Engineers**  
authorities on precision inspection. Get their advice on questions relative to gaging Dimensional Control.



STRIPPED FOR ACTION



TUTHILL

## "STRIPPED" PUMPS

Save Material, Space and Money

To save vital material, space and money, Tuthill offers dependable "stripped" pumps for direct incorporation into the design of the machine. Positive displacement, internal-gear, rotary type. Compact. Durable. Capacities from 1 to 50 g.p.m.



Series "S"



Series "SA"

Tuthill Series S are pumps without supporting brackets, shown above. Available with automatic reversing and internal by-passing features.

Tuthill Series SA provide only the pumping elements, including gears, cover and crescent. Ideal for built-in applications where special porting is necessary or mounting space limited.

Write for Tuthill Stripped Pump Catalog

**Tuthill PUMP COMPANY**

939 EAST 95TH STREET • Chicago

The keynote this year will be education—education that will be devoted solely to increasing production of war products. All of the technical talent of the four cooperating societies; all of the engineering and production experts of more than 250 leading manufacturers are being mobilized in the drive to help the metal industry do more with what it already has, to marshal every idea and every improved production method that will help win this war of metals.

Mr. Eisenman likens the coming meeting to a great university with some 200,000 square feet devoted to class rooms, lecture halls, conference and display spaces, with a faculty of thousands of technical and production wizards, the "know hows" and the "know whys" of the industry men who are anxious and willing to discuss, counsel and advise as to how we can do more with what we have.

Among the many drawing cards for the meeting will be twenty-five ASM War Production Sessions patterns after the successful defense meeting at last year's Congress. Outstanding authorities in government and industry will speak briefly, informally as off-the-record on important phases of these twenty-five timely topics, with all speakers acting later as members of an Information Panel for open discussion.

These ASM War Production Sessions will be definitely practical, operating on a give-and-take basis with metal men getting answers to their problems and contributing to the solution of others. These sessions will be entirely in addition to the technical sessions of the four cooperating societies. They will be held every afternoon and the first three evenings of the week at meeting rooms in the Cleveland Public Auditorium.

The Auditorium will also be the site of the War Production Edition of the National Metal Exposition, with

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**"We'll find Chucks  
that size if they're  
anywhere in town"**

Like hundreds of other plant items, even the best chucks—or anything else for that matter—wear out *some* time.

If new stocks are scarce and your want is immediate, you "need a friend" in a big hurry. *Here he is*, all set to give you the help you need—just call the Representative of your nearby Industrial Supply Distributor.

For, even if *he* hasn't any in stock, he is almost sure to know many possible sources that may be closed to you. So

This incident is typical of the unusual services that many Mill Supply Distributors are rendering their customers during the Emergency.

when he says "don't worry—we'll scout up an emergency supply for you if there's any in town," you can be sure he will make every effort to keep you going. And usually he will *succeed*.

It's good business to take your own Distributors into your confidence and use them all the time. We know, because for many years they have been *our* Sales Representatives

on Cle-Forge High-Speed Drills and Peerless High-Speed Reamers throughout Industrial America.

**The CLEVELAND**

TRADE MARK REG. U. S. PAT. OFF. AND FOREIGN COUNTRIES

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9 NORTH JEFFERSON ST. CHICAGO

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**TWIST DRILL  
COMPANY  
1242 EAST 49TH STREET  
CLEVELAND**



**"CLEVELAND" DISTRIBUTORS EVERYWHERE ARE READY TO SERVE YOU**

than 250 leading manufacturers contributing to the meeting's theme—an educational drive to help increase production of war products.

These companies will have their leading technical and engineering experts manning educational and conference displays which will be located on the arena floor, the lower exhibit hall, and in the north exhibit hall and arcade of the Auditorium. In addition to the educational exhibits of more than 250 companies, many government agencies will be represented in conference displays.

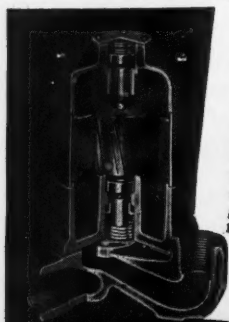
The Exposition will be open daily from 12:00 noon until 10:30 P. M. with the exception of Thursday, when it will close at 6:00 P. M. Admission will be free to all members of technical societies and to those holding executive passes distributed by exhibiting firms. Members of any technical society can register upon presentation of their membership cards.

Such registration provides admission to the Congress and Exposition for the entire week.

Some 100 papers will be presented at the regular sessions of the four cooperating societies—the American Society for Metals, the Wire Association, the American Welding Society and Iron and Steel and Metals Divisions of the American Institute of Mining & Metallurgical Engineers. One of the features of the ASM Program will be a series of five daily lectures on tool steels by James Gill, Chief Metallurgist, Vanadium Alloys Steel Company.

All morning sessions of the ASM will be held at the Statler Hotel, headquarters during the week for the Society, while afternoon and evening sessions will be at Public Auditorium.

All morning sessions will be adjourned promptly at 11:30 to permit attendance at the meetings in the Statler Ballroom to be addressed

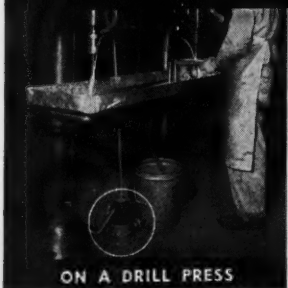


## The Coolant Pump For Every Job— **BRADY-PENROD MODEL 600**

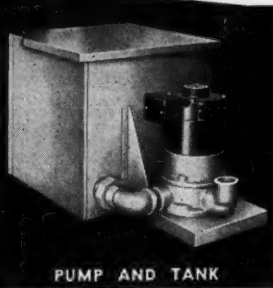
**Durable!** This pump stands up under hard use. Hydraulic efficiency as high as 70%. Quickly installed by any shop man at little cost and easily moved from one job to another. Controlled flow—60 g.p.h. with  $\frac{3}{4}$ " tubing to 1200 g.p.h. with 1" pipe.  $\frac{1}{2}$  H.P. NEMA motor meets any demand with negligible current cost.

**Tank With Built-in Baffle.** 12" x 12" heavy galvanized sheet iron with baffle separator to collect heavy chips. Painted machinery gray outside. Removable lid for cleaning without disconnecting return piping.

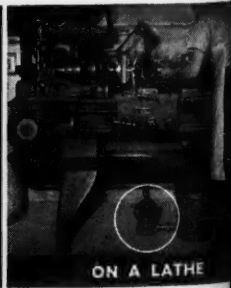
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**BRADY-PENROD, INC., Muncie, Indiana, U.S.A.**



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PUMP AND TANK



ON A LATHE

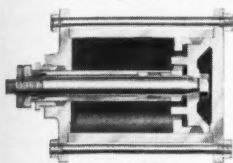
# AIR CYLINDERS

*BUILT TO*

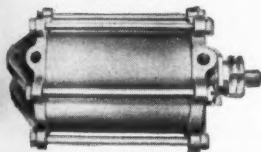
*STAY ON THE JOB*



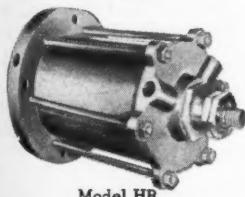
16 in. x 7 ft.  
honed cylinder bore



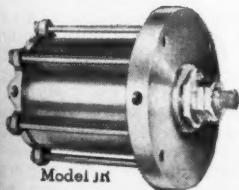
Sectional View



Model BR



Model HR



Model JR

Hannifin cylinders combine precision construction and simple outside adjustment of piston packing—two features that mean greatest useful work from air power, and uninterrupted production. All sizes are bored and then honed, producing a cylinder bore that is straight, round, and perfectly finished. Correct adjustment of the soft, graphite treated piston packing is easily made from outside the cylinder. The efficient piston seal can be maintained throughout the entire life of the piston packing. Full use can be made of air power, without leakage, with minimum friction loss, and simplest maintenance. The piston can be repacked if necessary with standard graphited packing, always available. No special parts are needed.

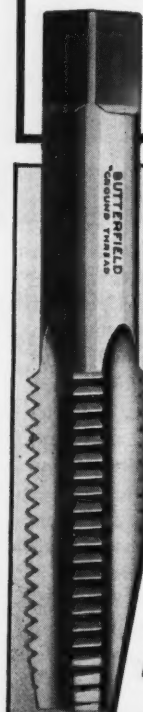
Hannifin pneumatic cylinders are built in a full range of standard mounting types, sizes 1 to 12 inch diameter, for any length stroke. Both single and double acting types, with or without cushion. Special cylinders built to order. Write for cylinder Bulletin 57-MM giving complete specifications.

**HANNIFIN MANUFACTURING COMPANY**  
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high government and War Products Board officials.

Other ASM events of outstanding importance will be the annual meeting and the Campbell Memorial Lecture on Wednesday morning, October 14th, and the annual ASM dinner Thursday evening, both to be held at the Statler Ballroom. John Chipman, Professor of Metallurgy at Massachusetts Institute of Technology, will deliver this year's Campbell Memorial Lecture.


Several important awards will be made at the ASM dinner, Thursday evening, with Benjamin F. Shepherd of Ingersoll-Rand Company and President of ASM receiving the Albert Sauveur Achievement Award, and John C. Garand, inventor of the Garand Automatic Rifle and member of the ASM, Springfield Chapter, receiving a special award. Dr. Oscar Harder will receive the President Medal, and the Henry Marion Howe Medal will be awarded during the evening.

A symposium on rare metals will feature the A.I.M.E.'s Metals division program, while production will be the theme of the Iron and Steel Division. Hotel headquarters will be at the Statler. The American Welding Society's headquarters will be at Hotel Cleveland, with the Wire Association at the Carter Hotel.

"Pneumatic Die Cushions." A catalog illustrating and describing its line of pneumatic die cushions for deep draw work is now being published by the Dayton Rogers Mfg. Co., 2830 S. 13th Ave., Minneapolis, Minn. The catalog also includes information on counterbalance cylinders for power press rams or slides, combination reducing regulating valves and pressure gages, adjustable spacing collars for milling machine cutter arbors, and so on, as well as useful cushion engineering data, including rules for finding die cushion size or holding pressures required on the cushion when dimensions of the first draw shell are available. Copy free.

# SAVE METAL

WHEN you purchase bronze bars or bearings in the "rough," you buy at least 25% more metal than you can use . . . precious metal that can help win the war. If you specify "Completely Machined," you leave this excess metal where it can be put to immediate use. Add to this the saving you make in machining time and tools. Then you will realize that it's both patriotic and economical to buy the finished product. All Johnson's UNIVERSAL Bars and General Purpose Bearings are completely machined—I. D.—O. D.—Ends.



The pile of turnings in the center is the actual amount of excess metal you remove from the market when you purchase rough bronze castings. These turnings are scrap to you but mighty valuable to your country in this present conflict.

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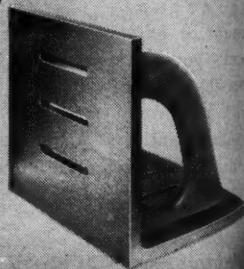
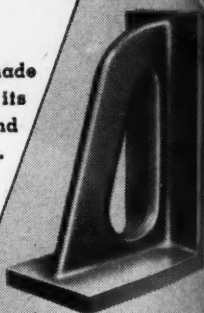
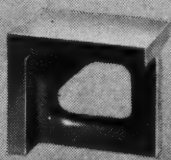
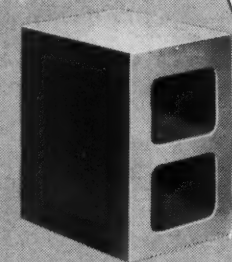
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This assures a smooth, flawless surface that increases efficiency of your inspection.

The surface plate has scientifically designed ribs to give absolute rigidity and strength to entire surface.

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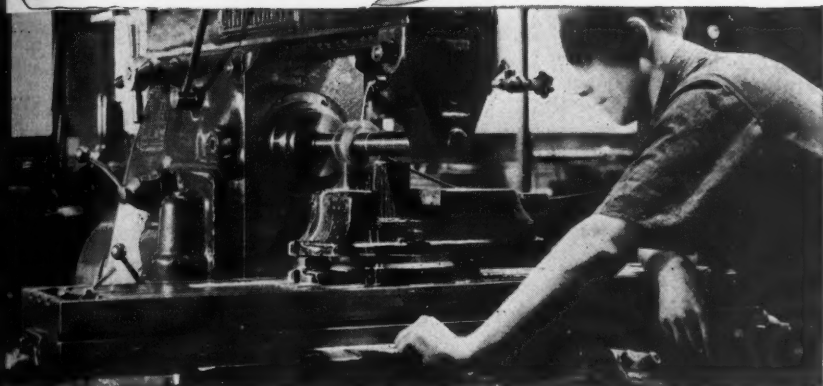
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There is no obligation for this service.

Just drop us a line on your letterhead and ask that a lubrication engineer call. But for your own protection, do it *today*.

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Please send me booklet on "Metal Cutting Lubrication."

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**A LUBRICANT FOR EVERY INDUSTRIAL NEED**

# Burn Another Inch of Electrode and Build Another Cargo Ship

**S**O vital is arc welding to America's tremendous shipbuilding program that failure to use the last available four inches of a welding electrode stub would mean a loss of 25 ships a month.

Although every 14-inch electrode can be burned down to a 2-inch or less stub, workmen sometimes throw away

3½ inches, and some even discard much as 6 inches.

The use of merely another inches on the average stub would be sufficient to add 5½ boats to the nearly 60 cargo vessels of arc weld construction the United States is turning out each month.

These estimates were made by

## WELDED SHIP PRODUCTION LOST PER MONTH in U.S. SHIPYARDS by discarding excessive Electrode Stub Ends

### MATERIAL AND LABOR LOST PER MONTH

If Stub End loss is  $3\frac{1}{3}$  inches

While Stub End loss should be 2 inches

Useful electrode loss is  $1\frac{1}{3}$  inches

Useful Electrode lost as per cent of total length used  $9\frac{1}{2}\%$

### SHIPS LOST PER MONTH

Length of Stubs      Number of Ships

2 inches ..... 0

3½ inches ..... 5½

4 inches ..... 8½

5 inches ..... 13

6 inches ..... 25

Approximate U.S. Cargo Shipyard consumption of Electrodes per month... 10,500,000/lbs.

Usable Electrode lost per month..... 1,000,000/lbs.

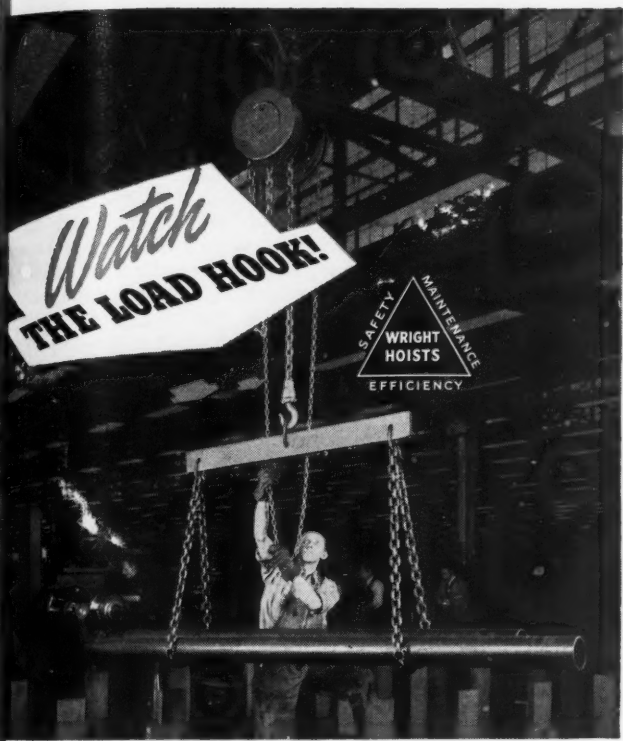
**BURN ANOTHER INCH \* BUILD ANOTHER SHIP**

Courtesy of The Lincoln Electric Co. Cleveland

### CHART SHOWING SHIP PRODUCTION LOST PER MONTH BY ELECTRODE WASTE.

A production equivalent to 5½ ships per month is lost by discarding stub ends 3½ inches. Moreover, 1,000,000 pounds of usable electrodes are lost per month.

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★In one of their recent bulletins on hoists, the National Safety Council says:

*"Hooks which have become bent on account of overloading should not be straightened and put back in service, but a new hook should be provided. When a hook is once bent the stress in the metal tends to weaken it so that afterward its strength is a matter of doubt and cannot be depended upon."*

**Watch the Hooks.** Wright load hooks are drop-forged from special steel which, when subjected to excessive overloading, give visible warning by opening slowly. When the bottom hook has started to open, look to the top hook, too, for while it is stronger than the bottom hook, it

also may be reaching a danger point.

**Don't Abuse Your Hoist.** Now that we are all faced with restrictions and shortages proper maintenance is of paramount importance. While every **WRIGHT HOIST** is built with load-carrying factors considerably in excess of their rated capacities, like many other well-made pieces of mechanical equipment built for specific duty, they should not be overloaded. Overloading is dangerous—to men, materials, machinery and steady production. Remember—abuse to machinery today is akin to sabotage. Conserve steel and maintain production schedules by careful use, regular inspection and proper lubrication.

## WRIGHT MANUFACTURING DIVISION

YORK, PA. CHICAGO SAN FRANCISCO NEW YORK

*In Business for Your Safety*

**AMERICAN CHAIN & CABLE COMPANY, Inc.**

BRIDGEPORT • CONNECTICUT





Davis, Vice President of The Lincoln Electric Company of Cleveland, the world's largest manufacturer of arc welding equipment.

"Construction of one arc welded cargo boat now requires the use of approximately 175,000 pounds of electrodes," Mr. Davis explained. "If you multiply that by 60—an approximation of the number of vessels of arc welded construction coming off the ways each month—you arrive at the huge figure of 10,500,000 pounds. In other words, every inch of welding is vital to the shipbuilding program.

"Each original electrode is 14 inches long, and if the average welder uses only 10 $\frac{3}{4}$  inches, the remaining 3 $\frac{1}{2}$  inches is thrown away as unusable. But we have found that he can very well use another 1 $\frac{1}{3}$  inches—enough to do all the welded construction on 5 $\frac{1}{2}$  vessels.

"By the same estimates, if he discards a 6-inch stub, he is throwing

away enough electrode material to weld 25 vessels. Therefore, it cannot be over-emphasized that every workman should use 12 inches of every 14-inch electrode that comes into his hands. An easy slogan for him to remember would be 'Burn Another Inch and Build Another Ship.'

"The control of stub-end loss, which are part of the cost of an electrode, is also an effective means of cost reduction, easily accomplished.

"The cost per pound of the metal that is deposited goes up sharply in proportion to the length of the stub end that is discarded. Thus, if 14-inch electrodes are burned to 1-inch stubs, the cost of the deposited metal is \$0.967 a pound; but if 14-inch electrodes are burned to 4-inch stubs the cost of the deposited metal goes up \$1.03. When 6-inch stubs are used the cost is \$1.089 and when 8-inch stubs remain the cost is \$1.206 a pound.

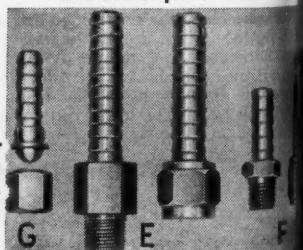
## An AIR GUN that won't leak or get out of order— one that Operators like



Only AIR-O-CHEK Air Guns give the positive, leakproof operation that maintenance men dream about.

No packing glands to leak or be adjusted.  
No protruding levers or buttons.

The only Air Gun with a totally enclosed lever that actuates the valve through a pin and socket joint.



Fittings for air and welding hose

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**METAL  
CUTTING  
METHODS**

**NEW BOOK**

**Tells How to Get  
MORE  
PRODUCTION  
from your  
METAL-CUTTING SAWS**

Under today's wartime conditions, Simonds' leadership in the manufacture of Metal-Cutting Saws involves a special duty to help all saw-users get the utmost in production on metal-cutting jobs.

Year after year, knowledge accumulates . . . resulting in better methods that increase production. This knowledge is now available in the compact Simonds handbook, "Metal-Cutting Methods", to help you choose the most efficient operating procedure. *This new book is free to users of metal-cutting saws. Write for your copy now, to:*

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There are a lot of ways to make diamond tools . . . but there's just ONE way to make them RIGHT! The proof is in the performance. It costs no more to get the exclusive advantages of our "Oxide-Free" process, providing superior quality to meet the unprecedented demands of modern war production.

- Write Dept. M for latest catalog and prices.

**Ceb abrasive**  
**DRESSING TOOL CO.**  
**DETROIT, MICHIGAN**

"Labor cost per pound of electrode deposited increases with increased stub-end losses, because of a great number of interruptions for changing electrodes and a lower operating factor. On the average, the labor cost increases 3 per cent for each inch above the standard 2-inch stub end loss.

"Burning down the 14-inch electrodes to stubs six inches long, a workman must make 12 electrode changes per pound of electrode material. If he burns them to 5 inches he has to make 11 inches; to 4 inches, 10 changes; to 3½ inches, 9 changes; and to 2 inches, 8 changes. Recent surveys indicate that one change requires an average of 21.6 seconds when the welder does his own cleaning of deposited bead."

"Molten Salt Baths" is the title of a 72-page illustrated Wire-O bound catalog published by the Electrochemical Department of E. I. du Pont de Nemours & Co., Wilmington, Del. Case handling of ferrous metals in baths containing sodium cyanide, use of simple cyanide baths as reheat media for high carbon and oil hardening alloy steels and for carbonized work, and nitriding of high speed steel and other high alloy tool steels in molten cyanide baths are described in the catalog. The Du Pont Accelerated Salt Bath for efficient production of mixed carbon-nitrogen case on plain carbon and alloy carburizing steels, and the Du Pont Carburizing Salt for production of deep cases at usual carburizing temperatures are also described.

In addition, the catalog includes information on Du Pont Heat Treatment Salts for heat treatment of steel and other metals and for heat coloring finished and polished steel parts, as well as information on salt bath equipment, cyanide disposal, modern analytical methods, safety in operation, first aid and medical aid. Copy of catalog is sent to executives and engineers upon request addressed on a company letterhead.

ENLIST TODAY in the War Bond Drive  
you can't fight, your dollars can.

# The Tool of Peace goes to War....



The iron or "trade" tomahawk—trade mark of Genesee products—was the first real contribution to better tooling in this country, being used as a general purpose tool by the peaceful Senecas of Je-nis-hi-yeh.

**Last month alone . . . Genesee delivered more "Tomahawk" Quality cutting tools to Industry for the war effort than it produced in the entire year of 1939.**

YET, GENESEE TOOL COMPANY is not a "war baby". It was incorporated in 1934 to supply the needs of automotive companies in Detroit, in Lansing, in Flint, in Pontiac. . . . Growth through the first years was purposely gradual. In those first years Genesee acquired and developed an organization second to none in the designing and production of cutting tools.

In recent years Genesee's growth has been accelerated. Its original plant was expanded,

re-equipped with the most modern of tool production equipment available . . . a second plant was acquired and equipped . . . a corps of trained field representatives was appointed, covering virtually every major industrial center.

Today it ranks as one of the most modern tool companies in the country, producing practically every type of tool used in industry . . . H.S.S. and carbide . . . standard and special . . . for turning and forming, reaming and counterboring and milling, etc.

We will be glad to send you a streamlined condensed catalog of Genesee tools. Ask for catalog No. GT-42 MM



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Trade Mark

## GENESEE TOOL COMPANY

FENTON, MICHIGAN

# "Save Manpower for Warpower"

## Theme of National Safety Congress and Exposition

To be held in Chicago, October 27th, 28th and 29th

**"SAVE** manpower for warpower!" is the theme of the 31st National Safety Congress and Exposition, to be held in Chicago, October 27th-29th. According to an announcement, the first wartime Congress since 1918 will be devoted completely to the safety job now at hand—to help win the war.

The entire Congress program, covering every phase of safety with 175 sessions and 500 program participants, will be centered on the problem of stopping accidents that delay victory by slowing production, impeding the movement of troops and supplies, and wasting manpower, material and time.

The Congress is the annual convention of the National Safety Council. It is the largest safety event in the world. Attendance averages 10,000, and safety leaders from all parts of the country assemble to exchange ideas, experiences and problems. Delegates this year will work overtime to cram the program into three days, instead of the usual five, and thus avoid week-end travel.

"We regard the 1942 Congress as the most important ever held," said Ned H. Dearborn, executive vice-president of the Council. "It will give

safety leaders the country over the first opportunity since the war began to meet for a mass attack on accidents that are delaying victory.

"Many of these safety men will bring to the Congress definite proposals that accidents can be stopped in the factories and on the highways, despite the rush of war production. They will pass along their effective safety programs to others who have not been so successful. The result will be that those who attend the Congress will go back to their jobs better prepared to stop wartime accidents.

"Safety has a wartime assignment that is just as specific as building tanks or producing food for the army. Our job is to stop accidents and save manpower. Right now, every accident casualty is a war casualty."

Headquarters for the Congress will be the Hotel Sherman in Chicago. Sessions also will be held in the Madison and LaSalle hotels. An exhibit of all types of safety appliances and equipment will be a feature of the Congress.

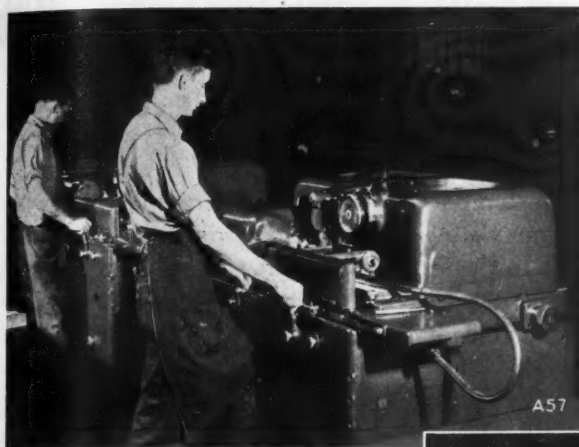
**WAR IS HELL**—but slavery would be worse. Do your part by buying a War Bond today!

TO FINISH THE JOB QUICKER



Unusual  
Performance  
As Usual

Grinding taper bridge  
reamers on several  
Landis 4" x 18" Type H  
Plain Hydraulics.



A57

## A REAMER MANUFACTURER GOES "LANDIS 4" TYPE-H"

Another small tool manufacturer is discovering the production advantages of the Landis 4" Type H Plain Hydraulic Grinder. This time it is the Wayne Tool Company, well-known reamer specialists.

One of the first reasons for this user's satisfaction is the fact that these Landis 4" Type H Plain Hydraulic Grinders may be switched over from straight infeed to traverse grinding or vice versa in an instant simply by the turning of a knob. In the handling of a wide variety of sizes and types of reamers, Wayne has found this to be a particularly attractive feature. Therefore, basically, high production grinders did

not give them such versatility nor such ease of handling either.

The hydraulically operated footstock spindle with foot pedal control is another contributing factor to this user's satisfaction. Operators like it because it frees one hand. Both machines are equipped with a hydraulic timer which steps up the production of work in larger lots.

No small tool manufacturer can afford to overlook the productionness of the Landis 4" Type H in those days when his output is needed so quickly and in such quantity.



A59

**LANDIS TOOL CO. WAYNESBORO, PENNSYLVANIA**



VARIABLE  
VOLTAGE  
HEADSTOCK.



MICROSPHERE  
WHEEL SPINDLE  
BEARINGS.



MICROMETER  
WHEEL FEED.

389



# MID-WEST REDUCED THIS GUN MAKER'S

## How Excessive is

The X Manufacturing Company, one of the largest gun builders in the United States, ran smack into serious trouble in the honing of their three-inch and five-inch gun barrels. The honing was being done in two operations—roughing and finishing—during which approximately .011" of stock was being removed. The trouble lay in excessive heat being generated within the barrels. The heat was so terrific company engineers had to pour oil on the outside of the barrels throughout the honing operation. Notwithstanding this, the heat caused considerable distortion and many of the barrels had to be straightened and rehoned.

Furthermore, the heat limited the honing machine to a steady run of only 15 minutes, after which the barrels had to cool for two hours before inspectors could star gauge the gun. Average time required to hone a barrel ranged from 4½ to 5 hours.


A Mid-West engineer was in-

vited in. He found the hones the company was using were too hard. They were "loading up," chipping along the edges, generating excessive heat and creating an altogether unsatisfactory finish. Following a few experimental runs with other stones he recommended the MID-WEST 180 52X hone for the rougher and the MID-WEST 500 38X hone for the finisher. These stones were adopted with this result:



# HONING TIME BY 83 PERCENT!

## Your Honing Time?

- 
- ✓ THE OIL COOLING TREATMENT HAS BEEN ABANDONED!
  - ✓ INSPECTORS CAN STAR GAUGE IMMEDIATELY AFTER HONING!
  - ✓ THE SURFACE FINISH HAS BEEN GREATLY IMPROVED!
  - ✓ AVERAGE HONING TIME HAS BEEN REDUCED FROM 4½ TO 5 HOURS TO APPROXIMATELY 50 MINUTES PER BARREL!

That is but one instance in which MID-WEST Micro Bond honing stones have helped to save time, material and money and increase production—all vital contributions to our war effort. There are many others. Why not ask our engineers—located in most large cities

throughout the United States—to tell you about them? Ask them about Micro Bond, the remarkable new abrasive developed by MID-WEST that has "given a new prod to production." Or, mail in the coupon printed herewith. Let us help you with your honing problem.

## MID-WEST ABRASIVE COMPANY

*Manufacturers of DEPENDABLE Abrasives*

1960 E. MILWAUKEE AVENUE

DETROIT, MICHIGAN

FOR VICTORY



Mid-West Abrasive Company,  
1960 E. Milwaukee Avenue,  
Detroit, Michigan

Gentlemen: Please send me additional information on Mid-West Micro Bond honing and superfinishing stones.

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Company

Address

City  State

# Modern Equipment at Work

## Machine Shop Keeps Fighting Ship in Trim

**C**ONSIDERING that a modern fighting ship is a huge steel hull into which has been built a network of machinery of all kinds, it is to be expected that such a ship would be prepared to maintain that machinery. Here is a view in one corner of the machine shop in a battleship, with three gobs busy at something besides seeing the world.

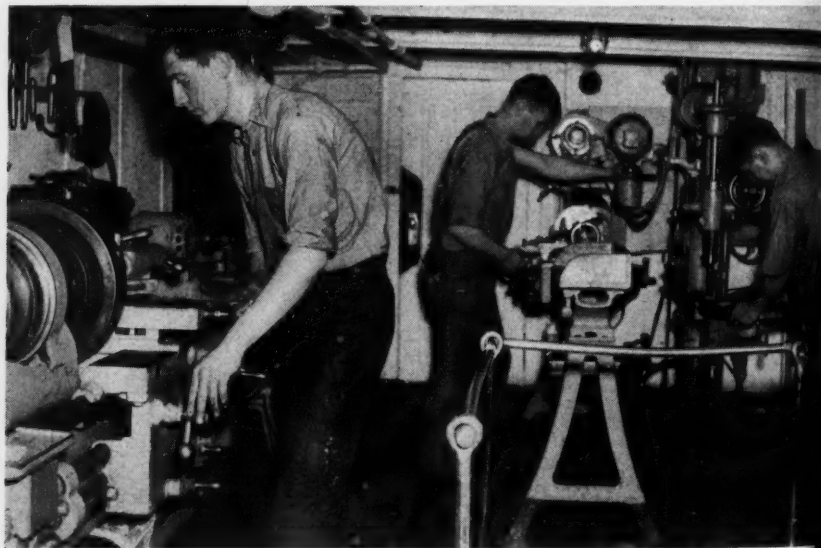
On a fighting ship every moving part of any size or weight is actuated by power, which necessitates hundreds of motors of all sizes, hundreds of gears, shafts, bearings, levers, and other parts that must be repaired

when necessary or replaced. The huge gun turrets are revolved by massive gears powered by an electric motor. The anchor is dropped or hoisted by power. When the guns are in action ammunition is delivered to the gun deck by power-operated elevators.

Every mechanical part must be kept in perfect condition at all times which is the reason why the machine shop is one of the most important parts of a fighting ship's equipment.

## Short Cuts in Production Welding at Lockheed

**S**PEEDING up the welding of heat-treated tubing for a "Lightning" P-38 or a Hudson Bomber, welders



View in Machine Shop in an American Fighting Ship

Here are  
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or brass  
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NEXT AMERICA

Using standard steel to  
in DISC SANDER Disc Sand  
and, full and perfect re

**DISC  
SANDER**

**Grind Quicker...  
Grind Smoother**

**ON EVERY WAR-TIME JOB  
WITH THESE**

**SKILSAW  
TOOLS!**

Here are FIVE kinds of SKILSAW TOOLS you shouldn't be without, if you want to speed your finishing operations, reduce waste and increase your output in war production. Do you have welds to grind down? Stainless steel or brass sheets to polish? Castings to clean? Small machine parts to finish? There's a SKILSAW TOOL for each of these operations . . . and the job will get done quicker and better and at lower cost.

These SKILSAW GRINDERS and SANDERS are typical of the entire line of SKILSAW TOOLS—designed to deliver results under today's stepped-up conditions, built to stand hard usage without time-wasting breakdowns. Look into America's busiest war-work plants and you'll see SKILSAW TOOLS on the job. Ask your distributor for a demonstration and you'll see why!

**SKILSAW** PORTABLE ELECTRIC **TOOLS**  
• MAKE AMERICA'S HANDS MORE PRODUCTIVE •

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Grind circles steel to a perfect finish in faster time with the Disc Sanders. Also remove welds, burrs and polish on flat or curved surfaces.

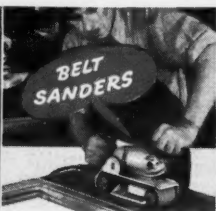
SKILSAW Belt Sanders speed up all "beat-finish" on flat surfaces of bronze, brass and all sheet metals. Quickly remove paint and varnish.

SKILSAW Hand Grinders are swifter, better on all grinding of JAG, dies and for precise finishing on intricate machine and castings.

Spotfed conveniently throughout the plant, SKILSAW Bench Grinders speed production, keep tools and work drift sharper . . . grind small parts quicker.



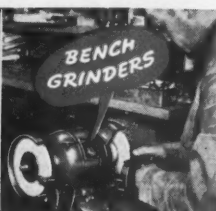
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**BELT SANDERS**



**HAND GRINDERS**



**BENCH GRINDERS**



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USING SKILSAW TOOLS!**

**NEW!**  
**SKILSAW PORTABLE GRINDERS**

Just introduced to speed up production on every war-time job...grinding down rough welds, smoothing welding beads, cleaning metals, filing, buffing and polishing on every metal surface.  
Two Models.

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## THREADWELL LICKS TOUGH THREADING JOBS MAKING "FULL FORM" BRITISH TAPS

Many American industries are working on orders for Great Britain where British form of thread is required. Here at Threadwell all Whitworth, British Standard Fine and British Association High Speed Taps as small as No. 10 B.A. are ground with a true "Full Form".

For long life and accuracy these taps are unsurpassed. Their manufacture requires the highest standards of workmanship and the most modern equipment. Threadwell has both - and will continue to turn out these "Taps of Distinction" in an all-out effort for final victory.

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**Threadwell**  
THE NEW NAME FOR  
SUPERLATIVE THREADING

**BRITISH  
TAPS**  
BRITISH STANDARD FINE  
WHITWORTH  
BRITISH ASSOCIATION

**"FULL-FORM"**

SALES AGENTS:  
Canada - BRIDGE MACHINERY COMPANY, Montreal  
England - SKYLUX, LTD., London

the Lockheed Aircraft plant in Burbank, Cal., work on small parts clamped to turn-tables which they rotate, as needed, with their feet. This device



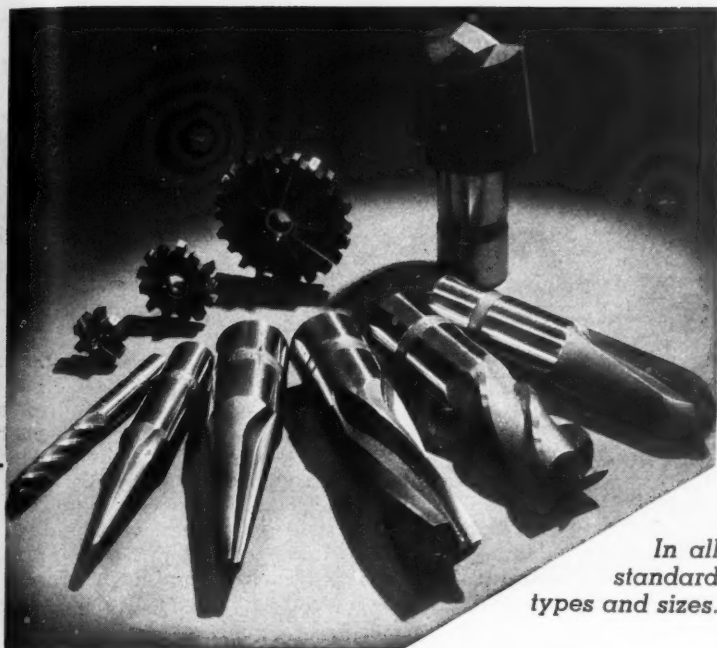
Illustration shows welder's turn-table on which work can be located during welding operation.

eliminates the necessity of laying down the torch to reposition the work, thus saving time.

Along side of each welder's position is an automatic torch lighter designed to allow the operator to turn off the torch without touching the regulating valves. A small pilot flame is used to relight torch when work is resumed.

## Clamped-On Carbide Tool Tips Simplify Job

**S**HOPS that make up their own carbide cutting tools can greatly simplify the job and at the same time be assured of strain-free tools by using



*In all  
standard  
types and sizes.*

## **T-J DIE SINKING MILLING CUTTERS**

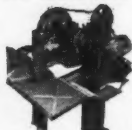
are sturdy, hold a sharp edge and carry less breakage percentage. They meet even today's production requirements with more work between grinds.

Write for Catalog No. 139 to  
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# **THE TOMKINS-JOHNSON CO.**



**RIVETERS**



**CLINCHERS**



**DIE SINKING  
MILLING CUTTERS**



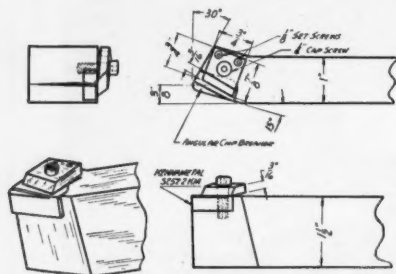
**AIR CYLINDERS  
(ALSO VALVES)**



**HYDRAULIC  
CYLINDERS**



clamped-on tool. A simple design which has been found very satisfactory is shown in the accompanying sketch. A tool shank is milled out, care being



Drawing Illustrating Method of Clamping Carbide Tool to Shank

taken to get as flat a surface under the tip as possible, and a simple clamp attached. The SAE 1045 clamp is not used to break the chips as it would soon be eroded to destruction. Instead, a conventional chip breaker of angu-

lar shelf type is ground into the Kennametal or other carbide tip.

Any danger of brazing strains is of course eliminated entirely, and grinding is greatly simplified since only the Kennametal is in contact with the grinding wheel, no steel to load up and glaze the special silicon carbide grain. One such SAE 1045 shank will serve to mount about four successive tips before it becomes cut and battered badly, and a harder steel would probably last even longer.

As the tip is reground, it is moved forward and out under the clamping shims being placed behind it. When the tip becomes too small for service in this tool, it can frequently be brazed into a smaller shank for lighter turning operations or boring.

The freedom from strains due to unequal expansion of tip and shank makes a great difference in tool life, particularly on "home made" tools which are frequently made under wide



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Special nails, rivets, screws and other cold-forged products made quickly and economically to your order. Facilities include those for swaging, fluting, knurling, milling, pointing, slotting, tapping and finishing. Send for catalog—no obligation. It will acquaint you with the possibilities of our inexpensive and better method. When you order from Hassall you benefit by ninety-two years of experience, embracing three previous national emergencies.

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## Increase Production

IN THE GRINDING AND FINISHING  
DEPT. WITH THE

# 3-M METHOD

using  
**3-M ABRASIVE  
BELTS . . and  
SEGMENT FACE  
CONTACT WHEELS**

If you are facing the problem of increasing production, check into the possibility of the Bench Type Backstand Idler, equipped with Segment Face Contact Wheel and 3-M Abrasive Belt.

"Handy"—quickly describes the Bench Type Backstand Idler because of its compactness. It is a powerhouse for turning out work—either for deburring, polishing or for production work on small parts.

It's the combination of Segment Face Contact Wheels and 3-M Abrasive Belts that does the trick. It will pay to send for full details.

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**MINNESOTA MINING & MFG. COMPANY**  
SAINT PAUL, MINNESOTA

**MFRS. OF 3-M PRODUCTS** 3-M Abrasive Paper and Cloth Products—"Scratch" Tapes  
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ing and Grinding Compound—3-M Cutting and Finishing Compound—3-M Roofing Granules



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**DIAMOND WHEELS**  
RESINOID BONDED

**SECOMET**



**S**ECOMET Resinoid Bonded Diamond Wheels can do your work more accurately, faster, and without appreciable wear. They are most economical for sharpening cemented carbide and multi-bladed tools, such as milling cutters, broaches, etc. Moreover, their sharp, free-cutting action eliminates lapping and the usual semi-finish grinding operation. Catalog on request.

*Prompt deliveries*

**J.K. SMIT & SONS, Inc.**  
157 Chambers St.  
New York  
N. Y.

ly vary conditions. In one plant, the use of clamped-on Kennametal tips made it possible to operate for months without a single case of serious tip breakage.

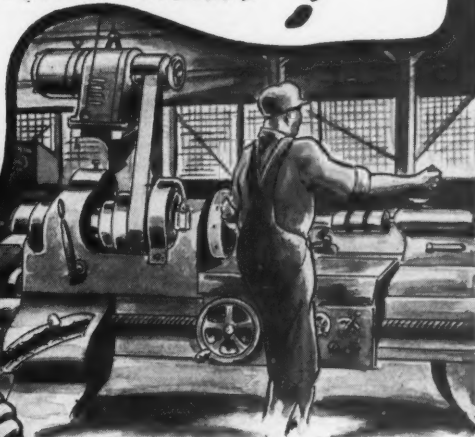
### "Spincraft" Metal Spinning Serves Research Project

**A**N interesting example of modern metal fabrication and its application to scientific research has recently been completed by Milwaukee Metal Spinning Company, Milwaukee, Wis., for the Ohio State University Department of Physics. This is a steel piece in the general form of a large open-end barrel, designed for use as an electro-static shield for



Part for Electrostatic Machine Spun from

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With LIMA GEARSHIFT DRIVES on your machines, you **WILL GET** the production you want, regardless of whether these are lathes, milling machines, shapers, boring mills, planers, gear hobbing machines or any other type requiring selective speeds, there is a LIMA GEARSHIFT DRIVE to do the job.

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1 to 5 HP

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Van der Graaff Electrostatic Generator which was being built to produce high-frequency X-rays. This electrostatic machine should deliver about three million volts, which means very high speed electrons and extremely high frequency X-rays.

Ordinarily, these large "caps" are made of copper, but due to war restrictions steel was substituted. This entailed extreme care and skill in the spinning operation, for while copper is comparatively easy to spin, the harder and heavier steel presents difficulties which can be overcome only by the use of the utmost precision and care. However, the steel cap was finished to exact specifications and measured up to the exacting requirements of the Ohio State University Physicists.

**Ideal Machine Tool Accessories** are the subject of an eight-page catalog released by the Ideal Commutator Dresser Co., 1031 Park Ave., Sycamore, Ill. The catalog illustrates and describes Ideal Live Centers, Metal Etcher, Demagnetizer, Grinding Wheel Dresser, Balancing Ways, Variable Speed Pulleys, Electric Marker, and Portable Cleaners. Copy free upon request.

**Genesee Condensed Tool Catalog**, a handy 6 x 9-inch condensed catalog covering its complete line of tungsten carbide and high speed steel cutting tools is now being issued by the Genesee Tool Co., Fenton, Mich. The catalog not only illustrates and lists sizes of standard tools but also contains numerous photographs of special tools. The catalog also contains a number of useful tables covering standard items such as standard keyways for cutters, dimensions of Morse and B & S taper shafts, weight per inch of round bars, and so on. Copy free upon request.

**Delta Booklet**. Many time-saving adaptations of machines to all branches of the armament program are photographically shown and described in an unusual booklet published by the Delta Mfg. Co., 601 E. Vienna Ave., Milwaukee, Wis. Scores of actual shop photographs show the wide range of application of Delta Drill Presses, Grinders, Cut-Off Machines, Abrasive Finishing Machines, Circular, Scroll and Band Saws.

Also included are numerous pictures of arsenals, aircraft plants, shipyard foundries, training schools, ammunition factories, and war production plants of all types, showing special setups developed at low cost, batteries of presses operated by women and unskilled labor, and clever short cuts made possible by Delta machines. Copy booklet free upon request.



## "Second Front Starts on Production Front"

The slogan "Let's Start the Second Front at Your Machine!" was the winning slogan recently in a weekly slogan contest conducted among Packard war workers as part of the "Work to Win" production drive to speed the output of Rolls-Royce motors for power plants and marine engines for boats.

The winner was Paul W. S. man, who is a milling machine operator in the Packard Marine Engine Division—and incidentally, a 35 per cent war bond subscriber.

# SPEED GRINDING 2 TO 5 TIMES!

**NEW POROUS GRINDING WHEEL WILL DO IT.  
FASTER, COOLER, FREE CUTTING. MAKE A TEST!**

**MORE** grinding production? Here's the answer. Por-os-way, a new kind of precision grinding wheel, tested and proved in our laboratories, is now speeding up production in scores of applications. Almost everywhere it's doing 2 to 5 times what was accomplished before by man per machine. Make a test—prove it for yourself!

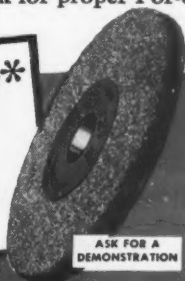
**POROUS, NOT COMPACT.** The secret of this new-type wheel is its porous, cellular structure, plus a new vitrified bond. The porous structure means that each grinding point is surrounded and cooled by air between contacts. Result: Por-os-way can take deeper cuts—.010" or more—with ease. Or your regular wheel at faster speeds. Wheel and work stay cool; even unskilled operators rarely burn work. Production is speeded amazingly—from 100% to 400%.

**HOLDS ITS CORNER.** On hard steels with deep cuts Por-os-way holds its corner, requires a minimum of dressing. To achieve this tenacity with porosity required the use of a tough, new vitrified bond.

**FOR ALL APPLICATIONS.** Por-os-way grinds hard tool and die steels with ease; softer materials—copper, tin, wood, plastics, too. On softer materials, loading is reduced surprisingly. Por-os-way is not a stock wheel. Grain, grade and porosity must be prescribed to your conditions.

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*a new*  
**RADIAC\* PRODUCT**



ASK FOR A  
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190 October, 1942

# SPEED GRINDING 2 TO 5 TIMES!

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FASTER, COOLER, FREE CUTTING. MAKE A TEST!**

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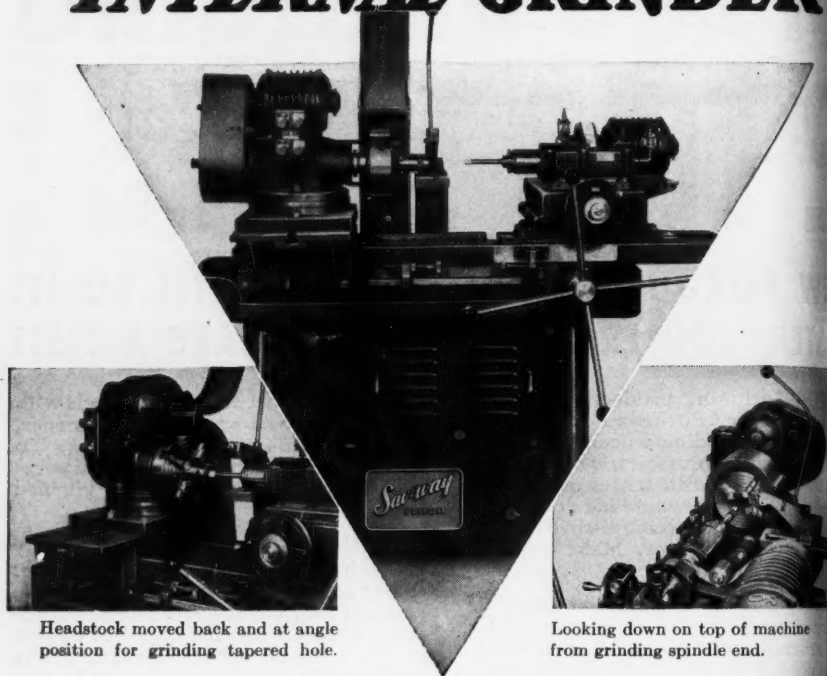
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*a new*  
**RADIAC\* PRODUCT**



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# *Saw-way* MULTI-PURPOSE **INTERNAL GRINDER**



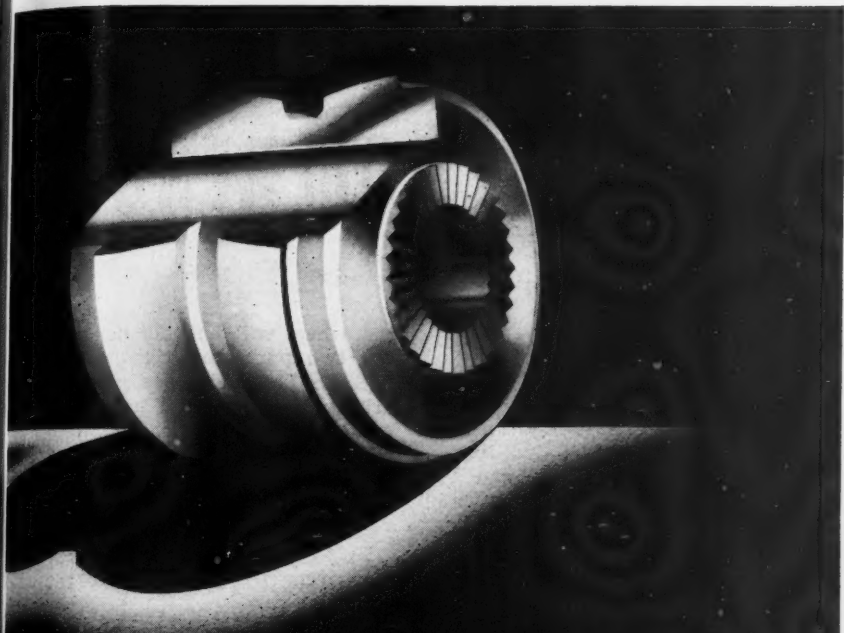
Headstock moved back and at angle position for grinding tapered hole.

Looking down on top of machine from grinding spindle end.

**O**ffers greater flexibility... precision grinder, designed and built by engineers with years practical experience to guide them . . . has a headstock traverse 6" . . . grinds holes  $\frac{1}{4}$ " to 18" in diameter . . . holes up to 9" deep straight or tapered . . . entire headstock may be moved at right angle to wheel traverse, by merely loosening two conveniently located nuts . . . worm compensating device permits grinding wheel head adjustment to .0001 . . . sturdy construction throughout . . . full specifications, delivery time and price on request.

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**A** simple tool or a tool of the most complicated design . . . all are of equal quality and workmanship.

- ★ END MILLS
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**WIRE FOR DETAILS AND DELIVERY DATA—  
WE'LL GIVE YOU QUICK ACTION!**



# IDEAS FROM READERS

## Simple Oil Grooving Tool

By A. W. PAYNE

**H**EREWITH is a drawing of a handy and inexpensive tool which we have found to be very useful for cutting oil grooves in babbitt and bronze bearings. It is also efficient for cutting off the fins that form when a babbitt bearing is poured.

The tool consists of a  $1\frac{1}{2}$ -inch "star" emery wheel dresser wheel assembled to an arbor of cold rolled steel, and is intended to be used in an air or electric hand grinder or drill. The arbor is made in two parts, as shown, one part being made with a shank so that it can be gripped in the chuck of the power unit and tapped with a  $\frac{1}{4}$ -inch S.A.E. thread, and the other part having a stud to fit the tapped hole in the first part.

The part that is tapped also has a shoulder slightly thinner than the thickness of the dresser wheel so that

the wheel will be held central when the two parts are tightly fitted together. The end piece has a screw driver slot in the end to aid in tightening. Each one of the points on the wheel is ground to a sharp edge so that it will cut as it is revolved by the motor.

## Emergency Hold-Down Bolt

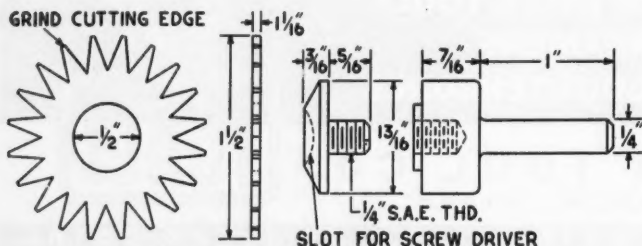
By ARTHUR HAVENS

**O**FTIMES the bolt grooves in a planer bed or drill press table will become so badly worn that difficulty is encountered in clamping the workpieces to the table. In some cases a whole setup will have to be changed and rearranged so that the mechanic can find a good spot in the table for his hold-down bolts.

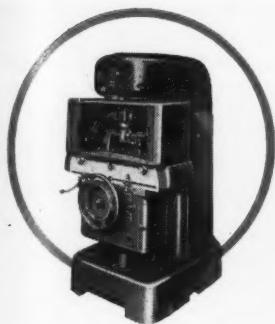
Of course, the broken bolt grooves can be repaired by building up the broken places with bronze, welded on

but for one reason or another this welding may be neglected. To ensure adequate clamping facilities without delay for repairs special clamping bolts should be made as follows.

A block of steel  $\frac{5}{8}$  inch thick by



Drawing of Oil Grooving Tool Made from "Star" Wheel

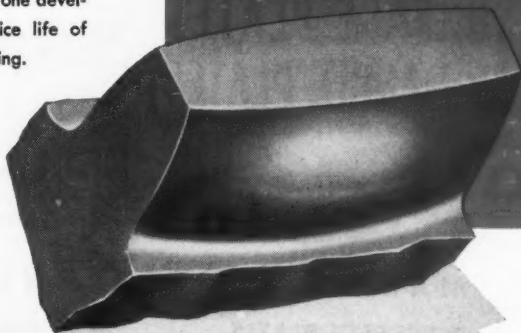


Red Ring Rotary Shaving finishes gear tooth surfaces accurately—faster than other methods and without producing any of those microscopic cracks in the tooth surface which are so hard to avoid with other gear finishing methods—and which are so prolific of fatigue failures in service. A Magnaflux test on shaved aircraft gears shows this conclusively.

This Patented Rotary Shaving Process which provides the Elliptoid Tooth Form has done more than any other one development to increase the service life of gears by eliminating end bearing.

Red Ring Shaving is an automatic process that is fast and economical. No skill is required in machine operation. It may, but need not, be followed by Red Ring Crossed Axes Lapping.

# **MAGNAFLUX** **TEST** ***proves*** **SUPERIORITY** **OF** **SHAVED GEARS**



*Write for*  
**Descriptive Bulletins**

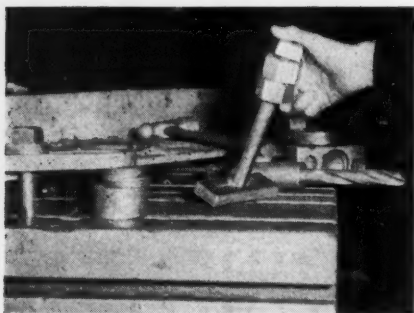
**NATIONAL BROACH**  
**AND MACHINE CO.**

**RED RING PRODUCTS**  
**5600 ST. JEAN • DETROIT, MICH.**

**SPECIALISTS ON SPUR AND HELICAL**  
**INVOLUTE GEAR PRACTICE**

**ORIGINATORS OF ROTARY SHAVING®**  
**AND ELLIPTOID TOOTH FORMS**





Using Special Clamping Bolt in Damaged T-Slot in Machine Table

4 inches long and just wide enough to slide into the T-slot easily is drilled and tapped in the exact center to take a  $\frac{3}{4}$  or  $\frac{7}{8}$ -inch stud. Into this block is threaded a stud which has also been threaded on the opposite end to take a nut. The 4-inch length of the steel block will be sufficient to span any break in the edge of the T-slot

and thus make it possible to clamp at any position in the length of the slot.

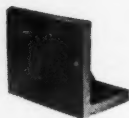
A number of these clamping bolts should be made up with studs of various lengths to accommodate the different work sizes. With all blocks, studs, and holes of the same size, except for the length of the studs, the parts will be interchangeable, which is an advantage.

## Practical Engineering Cuts Bills

By M. T. PATE

**A**LMOST as often as the Oilfields' Machine Company got out its bills, the Blank Pipeline Company's truck came around with a lot of cylinder heads and valve guides. The job was pressing out the old valve

## SURFACE PLATES AND ANGLE PLATES



These surface plates have a three point support. Top surface well supported by deep ribs. Made from seasoned castings.

**MACHINED-TOLERANCE .002"**

### SURFACE PLATES GROUND

Size	Net Price
12 x 12.....	\$20.00
10 x 15.....	18.00
12 x 18.....	22.00

**ACME TOOL CO.**  
202 CHURCH ST. NEW YORK, N. Y.

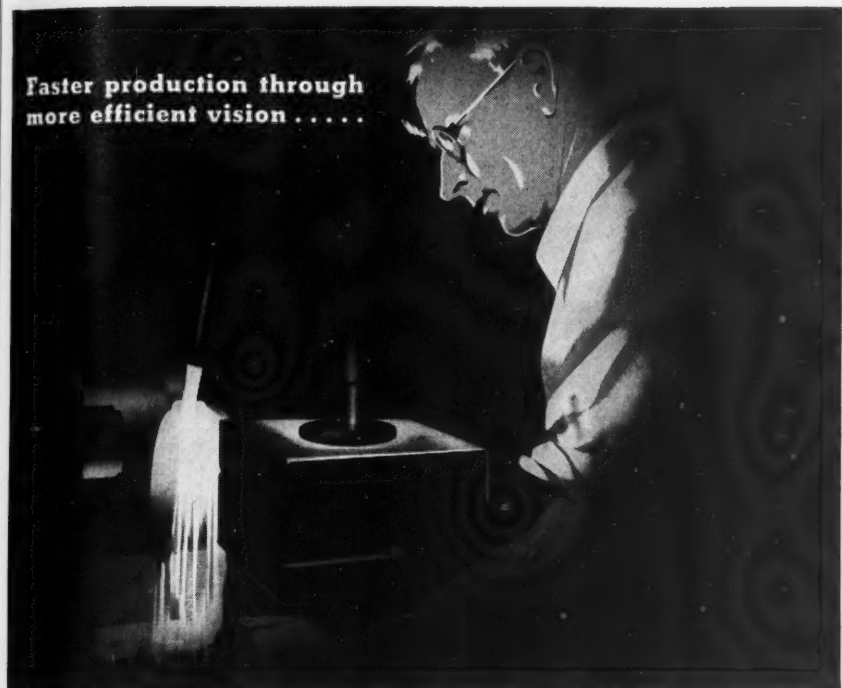
### ANGLE PLATES

Size	Net Price
4 x 4 x 4.....	\$ 4.75
5 x 5 x 5.....	9.25
6 x 6 x 6.....	12.25
8 x 8 x 8.....	19.25
8 x 10 x 12.....	28.00
12 x 12 x 12.....	39.50

Send for General Catalogue

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**Faster production through  
more efficient vision . . . .**



*Information supplied by "The American Weekly"—Mr. R. D. Potter, Science Editor*

More and more wartime conditions are bringing men over 40 into high-speed or close tolerance industrial work. Many of these have eyes not quite up to the job. Under peacetime conditions this defect is not of vital importance, but today, with every nerve strained to increase production, it is serious.

Some industries are giving mass eyesight examinations seeking to find those employees needing glasses or optical corrections in the glasses they now have. Still others take the added precaution of endeavoring to fit the job to the type of

eyesight available for it—near-sighted people may be excellent on close work such as bomb sight assemblies, whereas far-sighted people would be better suited to work on a large lathe where micrometer readings must be made at distances as great as 30 inches. Following this thought further some companies have employed special occupational eye glasses ground to fit the working conditions of the employee.

Efficient eyesight is the backbone of fast, accurate production. It will pay industry to further it by every means possible.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.  
MOLYBDIC OXIDE—BRIQUETTED OR CANNED • FERROMOLYBDENUM • "CALCIUM MOLYBDATE"

**Climax Molybdenum Company**  
**500 Fifth Avenue New York City**

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*Speed*  
**PRODUCTION--**

**SAVE TOOL  
ROOM TIME!**

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Clayton Boring Bar Holders offer a new 2-way clamping arrangement which: 1) permits changing or adjustment of any size boring bar within capacity of holder, without disturbing alignment with lathe; 2) maintains identical setting for subsequent operation when holder is removed from lathe; 3) provides rigidity for heavy cuts without chatter; 4) eliminates "fingering" adjustments or bushings.

You can get quick deliveries of Clayton Boring Bars, and save tool room time. They offer these features: 1) permanently calibrated quarter inch graduations which eliminate file or chalk marking; 2) minimum surface tension eliminates chatter and allows heavier cuts; 3) bit holes accurately broached to eliminate vibration and insure rigidity of bit.

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Bar Holders made for 9" to 36" lathes;  
Bars from 1/8" to 2 1/2" dia., 7" to 36" long;  
Bars may be ordered separately.

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MANUFACTURING CO.  
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guides and inserting the replacement after which the valve would be given a light grinding to ensure a tight seal on its seat even if the old and new guides did not happen to be exactly concentric.

The work paid well, was easy to handle, and the Pipeline Company never grumbled at, nor delayed, payment. Most shop managers would have let the matter drop there, but not so our shop superintendent. He went to the pipeline station and

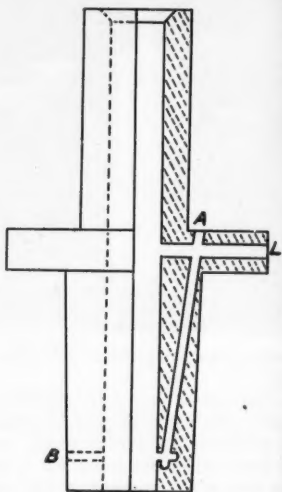


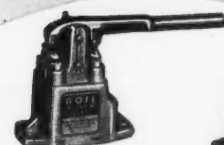
Fig. 1—Drawing Showing How Drilling of Hole in Valve Guide Permitted Adequate Lubrication of Valve

watched while a number of heads were pulled and burned valves taken out. In every instance the exhaust valves were the ones damaged, evidently burned by hot exhaust gases when the valve failed to close properly—or promptly.

Going further into the matter, it appeared that the engine builder used the same valve guide for both inlet and exhaust valves, the oil for the stem being introduced into the horizontal bore shown at "L" in the

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★ A SIZE AND TYPE FOR EVERY OPERATION ★



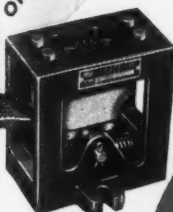
HAND CONTROL



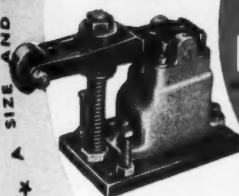
ALL AIR CONTROL



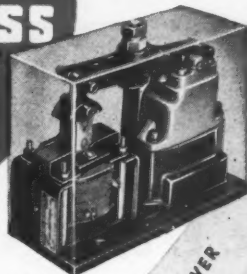
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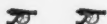
Because we are air control valve specialists, we, too, have an important job. Right now, that job is to help you keep your air control valve equipment functioning at peak efficiency . . . under the strenuous strain of wartime operation. Whether your equipment utilizes Ross Air Control Valves or air control valves of any other make, our service is at your command. A nation wide service organization of trained Ross engineers stands ready to bring you a quick solution to your air control problems . . . saving you precious man hours and priceless machine hours.

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(THE AXIS)**



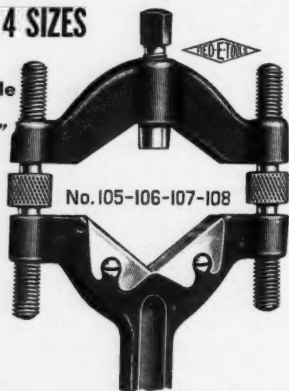
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sketch. That this lubricant failed to reach the lower portion of valve or guide was evident by the wear of the stem below that point, often making 0.008 inch or more after only a month's run.

Taking to the shop one of the burned exhaust valves with him, as shown in Fig. 2 herewith, he examined it

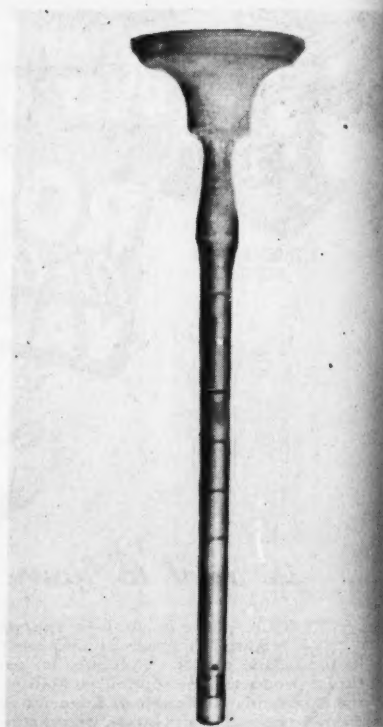


Fig. 2—Badly-Burned Exhaust Valve for Oilfield Engine

and discovered that the oil apparently formed a ring of carbon which together with the smaller rings in the lower three oil grooves, acted as miniature hones to wear away the stem guide and encourage the entrance of hot exhaust gases, corroding and cutting the metal and rapidly making so much clearance that the valve was

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**STANDARD**  
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**Capacities**—20, 30, 40 and 50 KVA.

**Throat Depth**—4 Sizes—12 to 36 inches.

**Operation**—Foot, Air or Motor Driven.

**Construction**—Completely Streamlined. Heavy duty.  
Easy to service.

**Flexibility**—Lower arm adjustable 8 inches vertically. Also in-and-out and rotary arm adjustment for electrode alignment and use of angle electrodes.

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**PROGRESSIVE WELDER CO.**  
3050 E. OUTER DRIVE  
DETROIT, U. S. A.



not guided to its seat.

After studying the valve, one of the guides was worked over as shown by the sketch, Fig. 1. A 1/4-inch hole was drilled through the spring seat and down into the tapered section which normally fitted within the cylinder head, terminating in the casting half an inch from its bottom. To intersect this hole a second horizontal bore "B" was made through the casting, that portion being shown as dotted being left as made, as it could not affect the valve action in any way.

After tapping the upper end of "A" and inserting a buried plug therein, the guide was tested out in an engine and, as was expected, carried enough oil to the base of the valve stem to ensure proper lubrication throughout the entire stem, the oil being introduced at the lowest point because the pressure of gas within the narrow clearance space between stem and guide tended to work the oil upward

toward the region of lessened pressure.

The innovation worked so well that the shop got an order to equip all future guide renewals in the same manner. The pipeline company's bills were cut to less than half their former amount—but the continuous and enthusiastic boosting which Blank Pipeline does for O. M. Co. could not be bought for many times the reduction in collections.

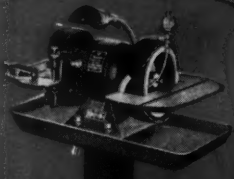
## Good File Cleaner

By A. H. WAYCHOFF

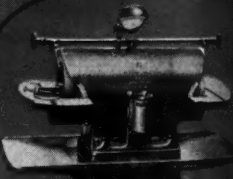
**I**N experimenting with various devices and methods of cleaning files, the instructor in a local vocational school discovered that the best tool for the purpose is a short section of the cable that is used to connect the storage battery to the ignition on an automobile.

# PROSSER CARBIDE GRINDERS

MODEL AA



MODEL E

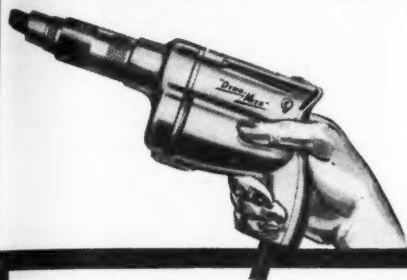


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"MY JOB calls for turning up nuts on a small sub-assembly. We've got to get these things out fast, and keep costs down while we do it. So about sunup on Saturday, I've had a heavy week. I'm tired . . . couldn't guess within four turns of the right tension. But I don't have to . . . this smart gadget does my thinking for me . . . snugs them up just right, disengages, and lets me go right on without missing a beat.

"That's one way we get production. That's one reason why we're going to win this war."

The "Adjustomatic" Clutch is an exclusive Millers Falls feature on several items in this quality line of portable electric tools. Extremely sensitive, it permits even inexperienced operators to work rapidly, setting up screws and nuts to exactly the pre-selected tension without delays, without marring the work. Smooth, vibrationless, trouble-free. Torque selection easily adjustable from outside . . . just re-set indexed collar. Available now to high-priority producers. MILLERS FALLS COMPANY, Greenfield, Mass.

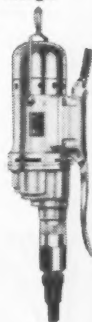


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The original pistol-grip electric nut-runner and screw driver. "Adjustomatic" Clutch, light-weight, easy one-hand control, packs plenty of power. Overall length 10". All voltages, speeds, at no extra charge.

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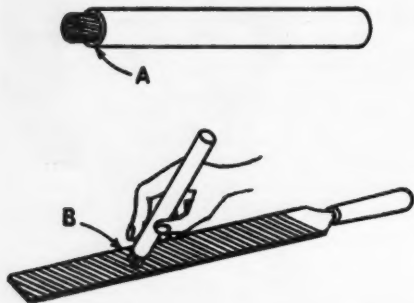


**MILLERS FALLS  
TOOLS**

SINCE  
1868

*At Work for Victory*

The cable used for this purpose is made up of a number of copper wires about 18 to 20 gauge, covered with a



Piece of Battery Cable Makes Good File Cleaner

heavy rubber insulation, and forming a strand about  $\frac{3}{8}$  inch in diameter. The cable is cut into pieces about six inches long and the rubber insulation

is removed for a distance of approximately  $\frac{1}{4}$  inch at the end as shown at A in the drawing.

To use, the exposed end of the cable is rubbed parallel with the teeth of the file as shown at B, removing the particles that have become jammed between the teeth. As the ends of the wire wear, the cleaner is "sharpened" by cutting away the insulation and leaving more of the wires exposed. The cleaner is very effective and will not hurt the cutting edges of the file teeth.

## "Flowing Springs at All Factory Doors"

By R. A. SHAW

**D**URING the present National Emergency, constant and specific checking is required at each entrance

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QUARTER CENTURY  
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This micrometer is guaranteed accurate and is guaranteed accurate. If for any reason you  
doubt its accuracy, return it to us within 30 days of purchase  
and we will refund your purchase price. This guarantee is void in case of damage, abuse,  
neglect or other causes not inherent in the tool itself.

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## COOLANT PUMP

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Designed by  
Francis E.  
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The most adaptable pump of all . . . MODEL 7500 by BRADY-PENROD, INC. This pump may be made an integral part of any grinder, lathe, cutting or drilling machine or can be easily moved from job to job as needed. A plate adapter is available to fit any tank or base opening. This model is a motor-driven open-impeller centrifugal type, submergible, with an outside discharge. Internal piping is eliminated; external piping reduced to a minimum. This simplification saves engineering and assembly labor.

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Motor capacity -  $\frac{1}{2}$  H.P. to  $1\frac{1}{2}$  H.P.

Controlled flow - from 4 g.p.m. to 100 g.p.m. with any standard coolant fluid. Suitable for use with abrasives. Special depths available.

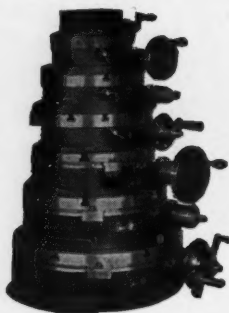
Long used as standard equipment by machine tool manufacturers, BRADY-PENROD Pumps (6 other models) are proving their reliability and high hydraulic efficiency in hundreds of locations today. Write or wire for details.

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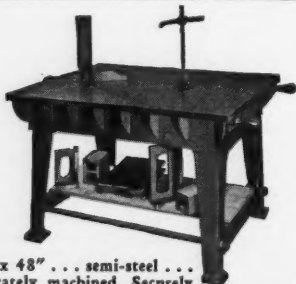
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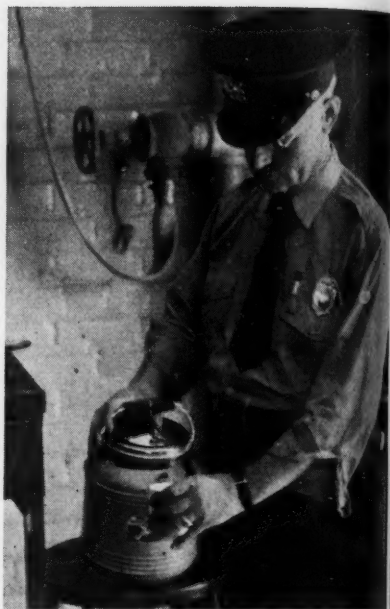


36" x 48" . . . semi-steel . . .  
accurately machined. Securely  
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smaller plates with planed or scraped surface.  
We also manufacture angles and parallels as  
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Guardsman pouring water from special thermos container installed at entrance to war production plant to eliminate necessity of having to leave his post for water

to factories, plants, and shops engaged in war work.

To eliminate the necessity of men employed to watch these entrances from leaving their post for a drink of water, the Murray Corporation of America, Detroit, Mich., has installed salt tablets in containers together with special thermost containers for water

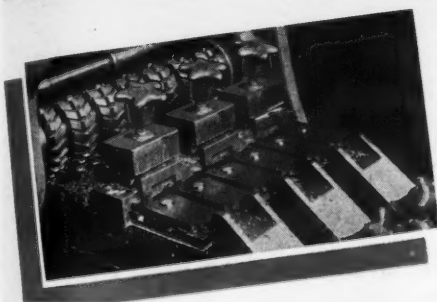
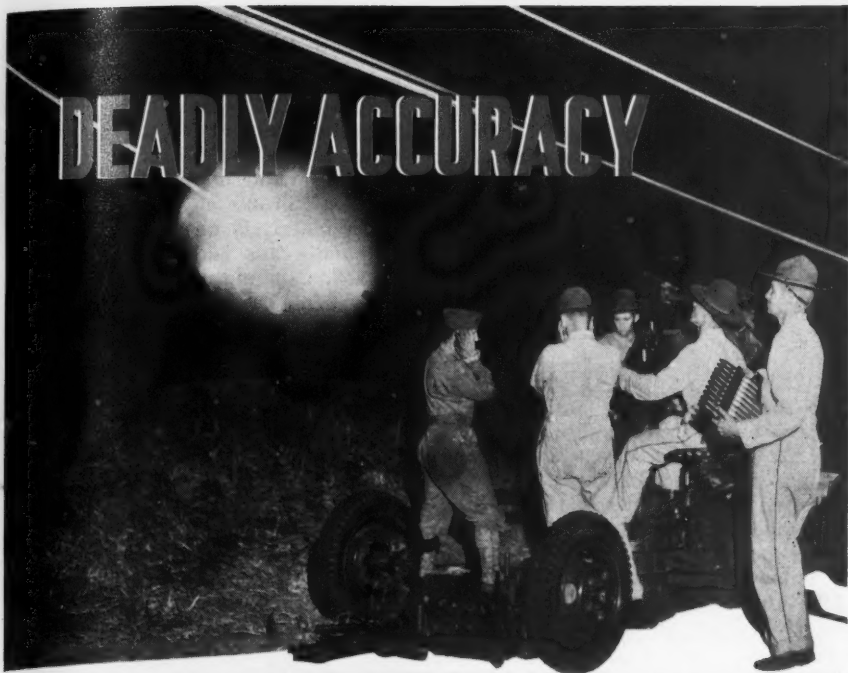
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at each entrance to its plant. The thermostat containers are filled at each change of guards with sufficient cool water to enable guardsmen to readily satisfy their desire for a cool drink of water without moving from their posts. Sanitary cups are included as a part of the water supply equipment.

## Handling Long Work in a Small Turret Lathe

By WALTER G. PORTER

**I**N these days of national emergency and need for maximum production we are all forced to use every piece of equipment available, in many instances to handle work that ordinarily might be handled much easier on more suitable machines.

This was the case on one of the jobs that came to us when, in an effort to keep an old customer satis-

fied, we were forced to use device means to handle a job that under normal conditions would be a very simple matter. The part to be processed happened to be one of the non-defense type, and since all of our regular screw machine capacity was taxed to the limit in our effort to produce defense materials first, we were forced to handle this job in a decidedly unorthodox manner.

The piece was a comparatively simple screw machine product, requiring no more than average tolerance on dimensions, to be made from  $\frac{1}{8}$ -inch round cold drawn steel. The finish part was a stem with a  $\frac{1}{4}$ -inch 20-pitch thread 17/32 inch long on one end and  $\frac{1}{8}$  inch long on the other. The middle was stock size, to be polished-ground by the centerless method, and then the entire piece to be bright nickel-plated. Having neither an automatic screw machine nor a duplex machine, we were put to the necessity

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**Single and Double End Mills.**

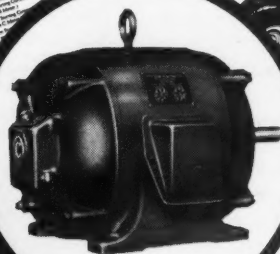
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Under the pressing demands of War, Century Motors are working 'round the clock, often on continuous 24-hour, 3-shift production. Proper motor care is more essential these days than ever before, for equipment *must* be kept running for the duration.

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City..... State.....

of finding the next best method.

Upon investigation we found that the Delta Manufacturing Company had recently placed a small abrasive cut-off machine on the market. We obtained one and equipped it with a circulating water coolant system, also with means to handle a production cutoff operation on what later proved to be 7,000 pieces per eight hours. This solved the problem of cutting the blanks to the correct over-all length.

We were then faced with the problem of threading the ends of the pieces. We found that the only machine in the shop that wasn't tied up on rush orders was a very old and decrepit Foster No. 0 hand turret lathe. The capacity of the machine was  $\frac{5}{8}$  inch on round stock, and it had been used for the most part to handle small quantities of second operation work on simple screw machine parts. However, the machine had a

spindle speed in excess of 2,200 r.p.m., which brought it into consideration.

The one big drawback to the use of this machine was that the maximum travel of the turret slide was about 4 inches, and since the die head would have to be operated on and off the work, the use of the slide would be necessary. However, inasmuch as the parts were  $6\frac{1}{8}$  inches long overall, it would be practically impossible to load and unload the piece from the chuck due to the fact that the turret slide could not be pulled back far enough away from the collet nose.

Then, since it would have been absolutely necessary to grip the part quite close to the chuck in order to prevent springing when forming the thread diameter, we also found that pulling the box slide back prevented getting the turret slide up close enough to the collet to reach the thread diameter on the work.

At this point it became plain that

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AUTOMATIC  
DIE HEADS

COLLAPSIBLE  
TAPS

BORING  
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THREADING  
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Greater strength with less weight—lower machining cost—elimination of pattern expense and scrap—smoother, finer appearance—these are the reasons why so many machine tools for war production work are today mounted on Mahon Welded Machine Bases and Frames. Methods developed by Mahon have set a new standard in the art of producing these very essential products in all sizes, shapes and weights. When you send your blueprints to Mahon you can be sure of prompt, accurate quotations. At your service are extensive production facilities and ultra modern tools in the hands of skilled craftsmen. Deliveries will be made as promised.

THE R. C. MAHON COMPANY  
DETROIT • • CHICAGO

These two views from stereo-  
tized photographs of a  
recently-built Mahon Base tell  
their own story of accuracy  
and fine finished appearance.

# MAHON

*Manufacturers of*  
Welded Machine  
Frames and  
Bases and Many  
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Products.

if it were possible to hold the part so that only half its length need be back in the collet, it would be easy

The first method tried consisted in using an ordinary knee-tool in one of the turret positions, but this tool

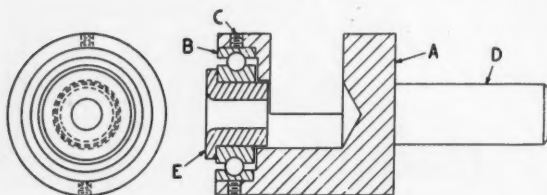


Fig. 1—Turret Stock Support for Small Turret Lathe

to get the pieces into and out of the collet and have plenty of turret slide movement left to perform the threading operation. Since it was obvious from the start that forming a thread diameter on a springy  $\frac{1}{8}$ -inch diameter piece at a point three inches from the collet jaws was out of the question, we decided that if adequate support could be supplied to the workpiece, the problem would be solved.

cut rings in the work which was not permissible so it had to be abandoned. We then obtained a piece of  $1\frac{1}{2}$ -inch diameter cold rolled steel, chucked it in the lathe chuck accurately, and centered it. The piece was then swung on centers and one end was turned to fit one of the holes in the turret.

Chucking the piece by this newly-turned shank, the opposite end of the piece was bored to a sliding fit for a double-sealed ball bearing which had been selected previously. A gap was then milled in the middle of the section, slightly wider than the length of the threaded end on the workpiece and deep enough to clear the hole in the ball bearing. With the ball bearing assembled to it, the piece was intended to serve as a steadyrest for the workpiece.

The steadyrest assembly is shown in the drawing Fig. 1. The body of the tool is indicated at A, the shank at D, the double-sealed ball bearing at B, setscrews located at even quarters around the periphery to hold the ball bearing in place at C, and a hardened and ground steel bushing at E.

The bushing is employed to prevent wear on the inner race of the ball bearing, and is made from drill rod

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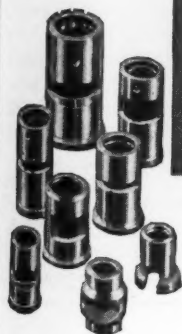
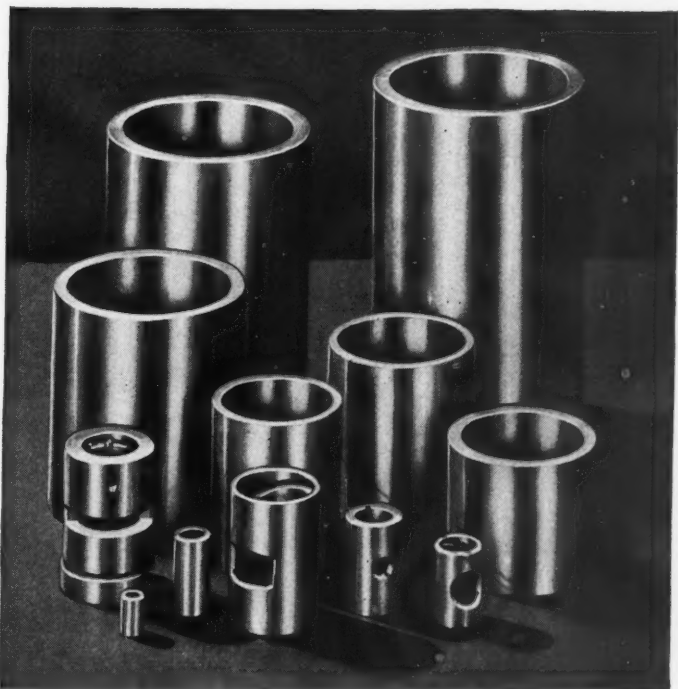
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and hardened and ground to a light press fit in the inner ball race. Before the steadyrest was milled, a hole slightly larger than the diameter of the bushing was drilled through the bottom of the counterbore, as shown, the point of the drill cutting into the

be maintained by the sealers, if a seal-type bearing is used. However, since cutting oil is used in the machine, this oil will provide adequate lubrication.

Having solved the problem of adequate radial support at a point three

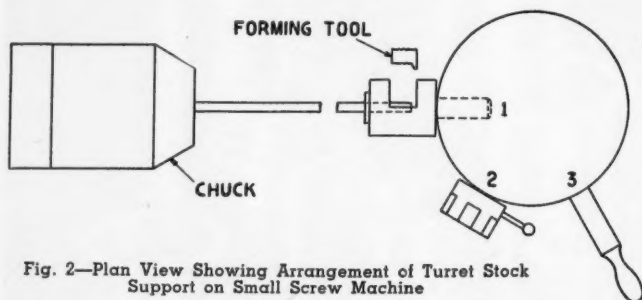


Fig. 2—Plan View Showing Arrangement of Turret Stock Support on Small Screw Machine

rear wall far enough to provide clearance for the rounded end of the work-piece.

The hole in the bushing is ground to a plug fit for the work, so that it will serve as a support. It must also be of the correct length so that the inner end will be flush with the inner face of the section in which it is used when it is assembled in place. As the forming tool operates in the milled-out space, the bushing will provide support up to the point of pressure.

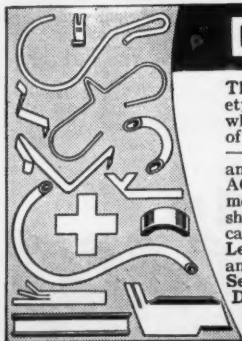
Lubrication of the bearing should

that long work can be handled by this means. Since the collet does not have anything to do with the support provided at the point of forming, the work could be of any length within the capacity of the machine.

The only factor to be reckoned with is torque. However, the radial load imposed by the forming tool which is used to turn the thread diameter is, of course, counteracted by the support afforded the work by the ball bearing steadyrest.

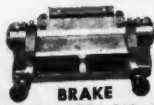
The drawing Fig. 2 shows the die-head occupying what might be called

to four inches away from the collet nose, we made the final setup very similar to the diagram Fig. 2. It will be noted that the end of the work-piece is some distance from the nose of the chuck, which is done to more vividly illustrate the point



## DIE-LESS DUPLICATING

The parts shown are typical of the great variety of simple or intricate forms and shapes which can be quickly duplicated to a tolerance of .001" with DI-ACRO Precision Machines — Shears, Brakes, Benders. For experimental and research work or production runs, DI-ACRO Units form angle, channel, tube, rod, moulding, wire, strip stock; shear stock sheets, trim duplicated stampings. With Die-Less Duplicating, die expense and time are frequently saved. Send for Catalog — "Metal Duplicating Without Dies".



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the second position, and at the third position on the turret is shown a small handle which was put onto the machine to assist the operator to swing the turret around to the No. 1 position with the least possible effort and delay. The handle was turned to fit the turret hole.

By using the method outlined above, it may be possible to use equipment which might otherwise be left idle. Such simple tools as the one described here will enable us to use every available tool to speed the national defense.

### "Expeditors" Wanted in War Production

With production hitting a faster pace than ever before, the Maritime Commission is calling for many "Expeditors" to break bottle necks and see that schedules are met in factories producing marine propelling or outfitting equipment.

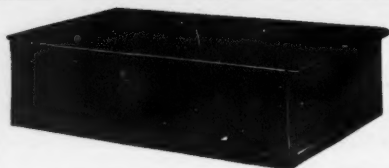
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recruiting Expeditors for positions paying \$2,600 to \$3,800. For positions paying \$3,200 to \$3,800, men are desired who have had experience in a factory engaged in the manufacture of heavy or moderately heavy machinery in positions at or above the grade of factory or shop foreman and in addition, experience as a factory representative, sales manager, sales engineer, or direct distributor for the factory. For the \$2,600 positions, experience as machinist or patternmaker or in other positions requiring a working knowledge of machine shop practice, is qualifying.

There are no age limits for this examination. No written tests are required. Applications will be accepted until the needs of the service have been met. However, qualified persons who are available and willing to contribute their skills on the production line are urged to file their applications at once.

Applications are not desired from persons engaged on War work unless a change of position would result in the utilization of higher skills possessed by the worker.

Announcements and application forms may be obtained at any first- or second-class post office or from the Civil Service Commission, Washington, D. C.



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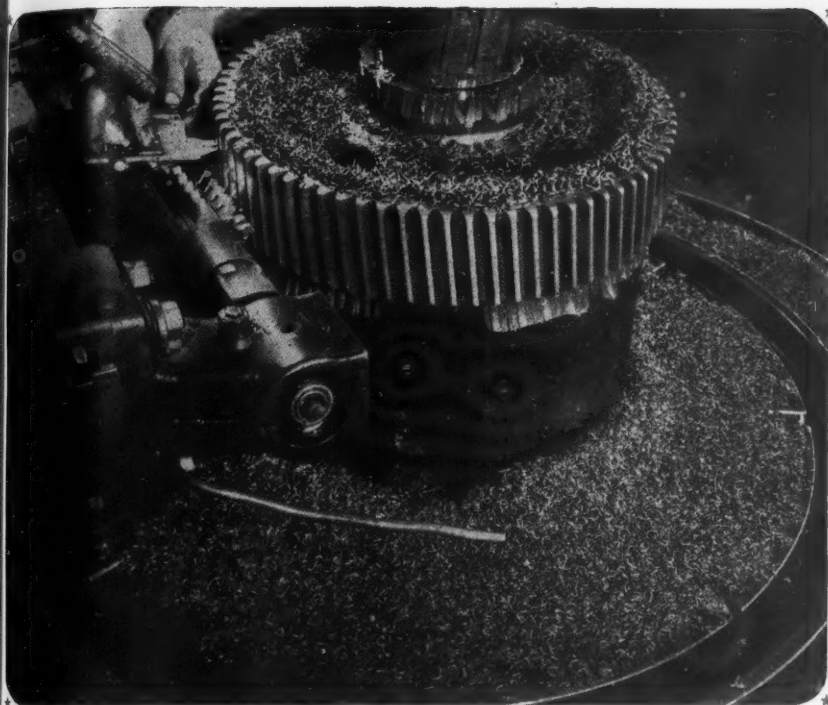
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**I**N this war, machine tools on the average are cutting away steel at a rate more than 12 times faster than in 1918. That's production—keep them cutting!

Keep them cutting *faster* by selecting tool steels more closely suited to the job. Case after case in our files show increases in feeds, speeds, or pieces per grind—increases, often, of 50% and more—when the *right* tool steel went to work.

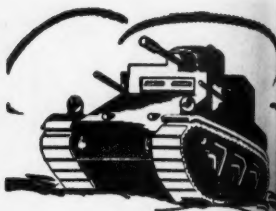
Keep them cutting *constantly* by knowing the best alternate tool steel for each job. Know it, and know its performance, as insurance against a time when your first-choice steel may be short in supply.

*And save the pieces!* Every particle of steel, especially High Speed Steel, is important, and much critical alloy material can be saved for re-use if proper methods of reclamation and classification are employed. Let

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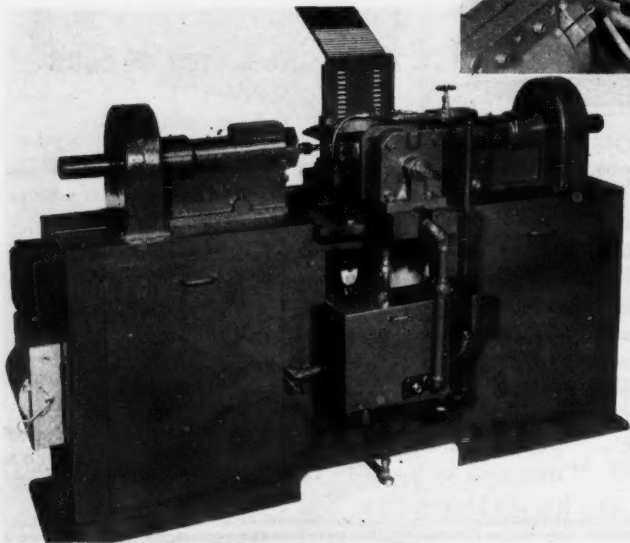
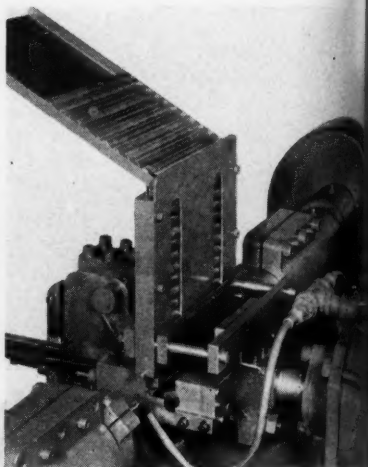


## Tools For National Defense

### Pines Profiler with Automatic Feed Attachment

Pines Engineering Co., Inc., Aurora, Ill., announces the addition of an automatic chute feed to the air chuck on its two-spindle profiling machine. This attachment can be used for feeding such items as brass and copper primer tubes for boring and tapping operation on both ends at the same time. According to the manufacturer, production from such machines can be increased as much as 30 per cent by the addition of this feed attachment.

Pines Profilers are being employed in war production for burring, chamfering, facing, threading, centering, reaming,



(Above) — Close-up  
View of Automatic  
Feed Attachment  
(Left) — Pines Profiler  
with Automatic Feed  
Attachment

and boring both ends of tubes and rods simultaneously for such important items as bomb tank tread tubes and pins, and so on. Several of these profiling operations may be combined and performed at the same time, thus greatly increasing output and decreasing man hours.

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"LENOX" Diemaster Saws are particularly designed for fast precision work on all contour sawing, die-cutting and similar operations, now demanded by speed-up industrial activity throughout the country. They are adaptable for die and band sawing machines.

100 foot coils packed in safety box—any length material can be drawn out and window shows unused portion of coil—size plainly marked on box end.



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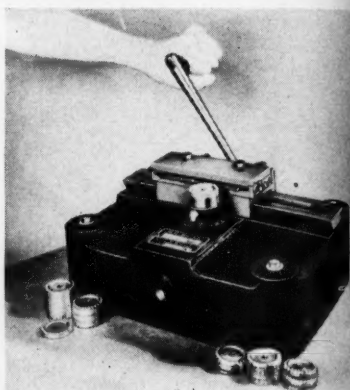
**HACK SAWS  
BAND SAWS**

*"The Blade in the Plaid Box"*

## Acromark No. 927 Marking Machine

Especially designed for marking letters around the periphery of aluminum aircraft instrument parts adjacent to the position of each lug on the parts, a marking machine designated as the No. 927 is now being offered by The Acromark Corp., Morrell St., Elizabeth, N. J. Die-cast parts are also said to be readily marked on the machine as well as parts of steel, brass and other metals and materials.

A special mandrel holds the work on



Acromark No. 927 Marking Machine

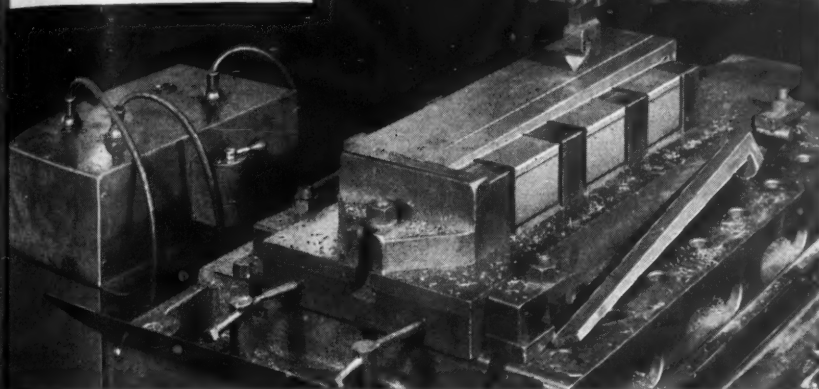
slide conveys straight line type past the impressing the desired marking. The mandrel can be made in any desired size to suit the parts to be marked. A slide from the mandrel extends into the body of the machine and is rotated by a rack and pinion beneath the slide which controls the marking and ensures accuracy. A geared arrangement advances the slide as the operating handle is moved forward. A second part is marked on the return stroke of the handle.

The body of the Acromark No. 927 Marking Machine is a gray iron hollow casting designed to provide space for operating mechanism underneath. The machine is compactly built and is easy to operate so that after setting, unskilled workmen can turn out accurate work at a high production rate.

An outstanding feature of the No. 927 machine is the straight line holder, which

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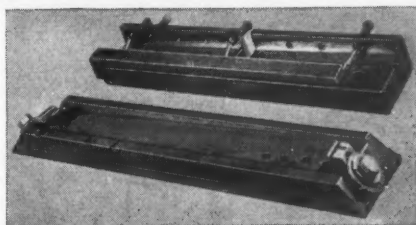
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The photo shows only one of the many time-saving applications of this remarkable new-type chuck. Utilizing the principle of "Magnetic Body Flo," this method of holding work goes far beyond the limitations of conventional magnetic chucks, providing power and adaptability not heretofore possible. In all types of surface grinders, as well as planers and shapers . . . in the tool room and on the production line . . . hundreds of shops are now enjoying the amazing advantages of ANDERSON & BROWN Magnetic Chucks.

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Learn more about how this magnetic chuck can save you time and money! Write for your copy of "Magnetic Chucking Revolutionized."



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The above jigs and several operations were eliminated from the job illustrated at top of page. Why not save the cost of fixtures and speed up your production with ANDERSON & BROWN Magnetic Chucks?

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utilizes straight line standard type or dies that are easy to space for precision marking. The holder is constructed for easy changing of type and dies and is provided with screw adjustment at the back for controlling marking depth.

### "No-Ox-Idized" Moisture-Proof Wrapping Material

Especially designed for protecting gun, tank, and plane parts, as well as other parts, from rust, a strong moisture-proof wrapping material known as "No-Ox-Idized" has been developed by the Dearborn Chemical Co., 310 S. Michigan Ave., Chicago, Ill. The material is made of Du Pont cellophane film laminated to a light cotton fabric known as scrim and then impregnated with other moisture-proof materials. The wrapper is available in several types and thicknesses.

In use, parts can be sealed by twisting the ends of the package by hand or by using a heat-sealing device. The cellophane is said to add strength and help make the material oil and acid resistant.

According to the manufacturer, the material is being used or tested on a large variety of articles including rifles, airplane propellers, aircraft guns, machine guns, ammunition, carburetors, bearings, gears, regular parts on way to assembly point, spare parts shipped to zones of action, machine tools, and magnetos.

With the "No-Ox-Idized" Wrapping Material, the finished part or article may be thoroughly cleaned of dirt and machining oils at the point of production and then wrapped in the cellulose material without any other protection against rusting except a light coating of oil which in many cases need not be removed or lump of moisture-absorbing silica gel placed inside the wrapping.

### Eclipse Spraying Unit for 8-Inch Shells

A special unit for spray coating 8-inch shells in a vertical position has been built by the Eclipse Air Brush Co., 40 Park Ave., Newark, N. J. Inside coating operations are performed by means of

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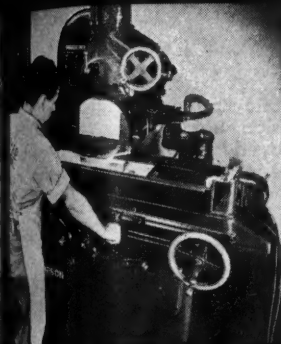
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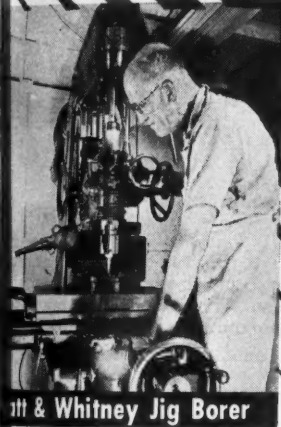


Thompson Surface Grinder

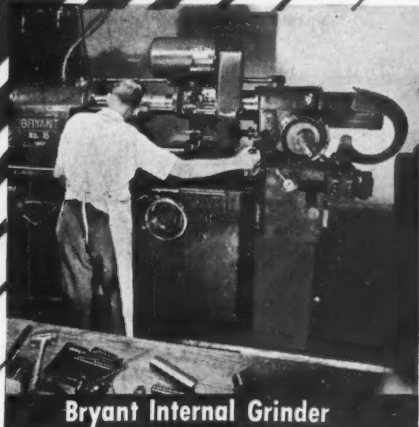


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## FIRST THINGS FIRST



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Bryant Internal Grinder

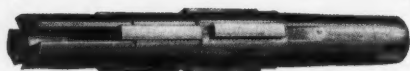
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So you'll know what's behind our statement—that VARD builds fine precision gages—look at these pictures. Here are only four machines—each tops in its field—part of many at VARD. By first getting fine machinery—with skilled mechanics—we turn out precision-built snap gages, plug gages, ring gages, pipe gages, taps, thread chasers, lathe compounds, dividing engines and aircraft parts.

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### NICHOLSON EXPANDING MANDRELS



#### TYPE A—STEP JAW DESIGN

Especially adapted for holding work with small bores while being machined between centers on lathes, grinders, millers, shapers, etc.

Size No.	Range of Bores Taken	Net Price
1A	$\frac{1}{8}$ " to $1\frac{1}{2}$ "	\$12.00
2A	$\frac{1}{4}$ " to $1\frac{1}{2}$ "	16.00
3A	$1\frac{1}{2}$ " to 2"	23.00
4A	2" to 3"	34.00
5A	3" to 4"	40.00



#### TYPE B—STRAIGHT JAW DESIGN

Adapted for work with both short and long bores.

Size No.	Range of Bores Taken	Net Price
1X	$\frac{1}{8}$ " to $\frac{3}{8}$ "	\$10.00
2X	$\frac{1}{4}$ " to $2\frac{1}{32}$ "	11.00
3X	$2\frac{1}{32}$ " to $\frac{1}{2}$ "	12.00
00	$\frac{1}{2}$ " to $\frac{3}{4}$ "	14.00
0	$\frac{3}{4}$ " to 1"	16.00
1	1" to $1\frac{1}{4}$ "	18.00
2	$1\frac{1}{4}$ " to $1\frac{3}{4}$ "	21.00
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4	2" to $2\frac{1}{4}$ "	40.00

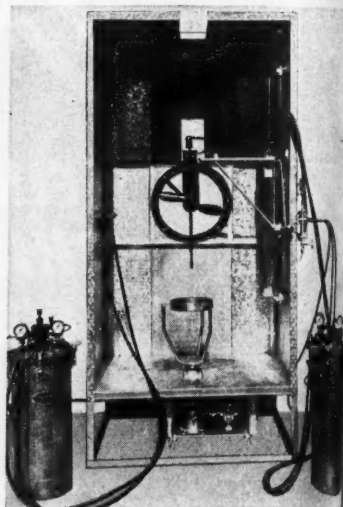
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Hardened tool steel, accurately ground. Sold singly or in sets. Prompt delivery. Write for bulletin.

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136 OREGON STREET  
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semi-automatic spray gun fitted with long extension nozzle. The outside shells is sprayed by the same operator who performs the inside coating operations. Shells are rotated by an air motor.



Eclipse Spraying Unit for 8-Inch Shells

tripod with a ring at the top to hold the driving band from paint. The unit of production with the Eclipse Spraying Unit is approximately 25 shells per hour.

### Kent-Owens 5-Spindle Head Milling Shell-Staking Notches

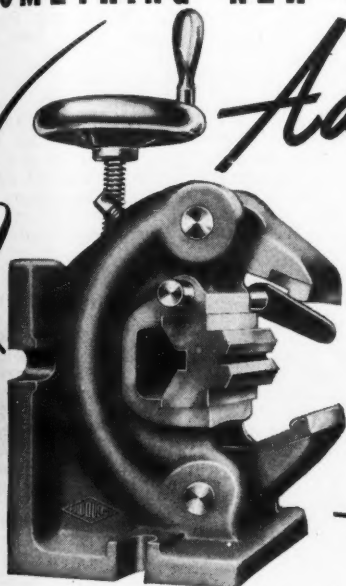
A multiple spindle head for application to a milling machine to simultaneously mill staking notches in the noses of a number of shells has been placed on the market by Kent-Owens Machine Company, Toledo, Ohio.

The head is designed to be slipped over the overarm, where it is locked in position. The five spindles are driven through a system of gearing for which power is supplied from the machine spindle, r.p.m. being stepped up so that the milling tools operate at the correct speed. The shell is held in a simple fixture of welded construction, so designed that the shell is rolled onto it from an adjacent conveyor and supplied with a cam-

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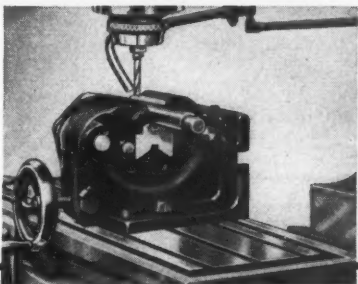
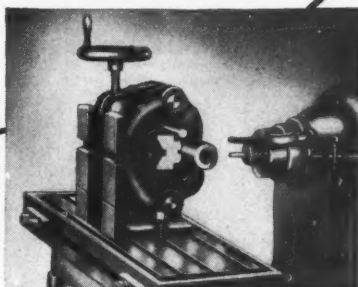


*Self-Centering Shaft Vise*

An entirely new idea in Vise construction in this Country. For machining keyways and slots in shafts or spindles — range of sizes  $\frac{3}{8}$ " to  $3\frac{1}{4}$ " diameter — suitable for vertical or horizontal mounting. Setting of Vise remains unaltered for all work diameters and insures accurate radial cuts. Shafts correctly located in V jaw by equal movement of two jaws. Hardened V jaw reversible in Vise.

Size of Base 8" x 7  $\frac{1}{4}$ " — Approximate weight 80 lbs.

*Write for circular*

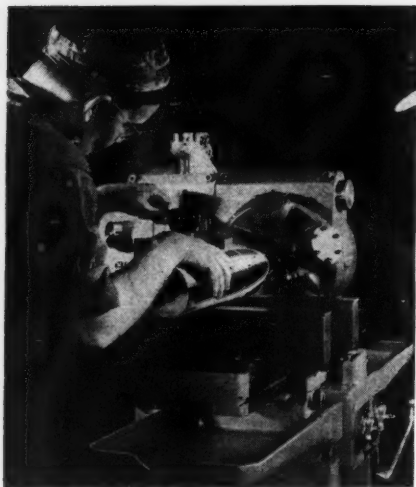


**The PRODUCTO MACHINE COMPANY**



990 HOUSATONIC AVENUE 3017 MEDBURY AVENUE  
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Kent-Owens Milling Machine Equipped with Five-Spindle Head for Milling Shell-Staking Notches

clamp to hold the shell for notching.

The illustration shows a 5-spindle head in operation, milling five staking notches in a typical shell. Inasmuch as the notches are milled simultaneously, both machining and handling time are reduced to a fraction of the time formerly required. The unit can be adapted for use on either a Kent-Owens No. 1-8 horizontal mill with hydraulic feed to the table, the No. 1-M machine with hand feed.

"Pumps . . . for the Purpose" is the title of a general catalog prepared by

the Tuthill Pump Co., 939 E. 95th St. Chicago, Ill. The catalog presents illustrations, descriptions, and tables on Tuthill Small Industrial Pumps, General Purpose Pumps, Viscous Liquid Pumps, High-Pressure Pumps, Coolant Pumps, Automatic Reversing Pumps and Stripped Pumps. Copy free upon request.

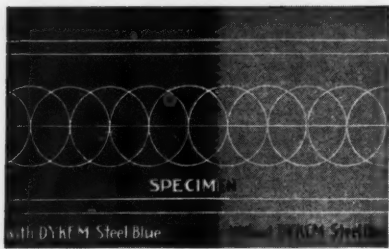
**Ammco Hi-Speed Honing and Lapping Machine** for cylinder bores up to 24 inches diameter is the subject of a four-page illustrated folder released by Automotive Maintenance Machinery Co., 2104 Commonwealth Ave., North Chicago, Ill. Copy free upon request.

**Detroit Tap Reconditioning Wall Chart.** To facilitate the correct reconditioning of taps, the Detroit Tap & Tool Co., 8432 Butler St., Detroit, Mich., is now issuing a handy wall chart containing details as to recommended methods of sharpening various types of taps, including taper, plug, bottoming, and spiral pointed types. The information given shows the correct number of threads to be ground for chamfering each type of tap as well as the angle to which the various tap chamfers should be ground.

The Detroit Tap Reconditioning Chart is printed on heavy card stock and is provided with an eyelet for hanging near tap reconditioning machine. Chart free upon request.

#### Seamlex Company Moves

To meet the increased demand for Seamlex All-Metal Hose by industry and Government, Seamlex Company, Inc., have moved into an enlarged factory located at 27-27 Jackson Avenue, Long Island City, New York.



## DYKEM STEEL BLUE

### Stops Losses in Making Dies and Templates

Simply brush on, right at the bench; ready for the layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

Write for full information.

### THE DYKEM COMPANY

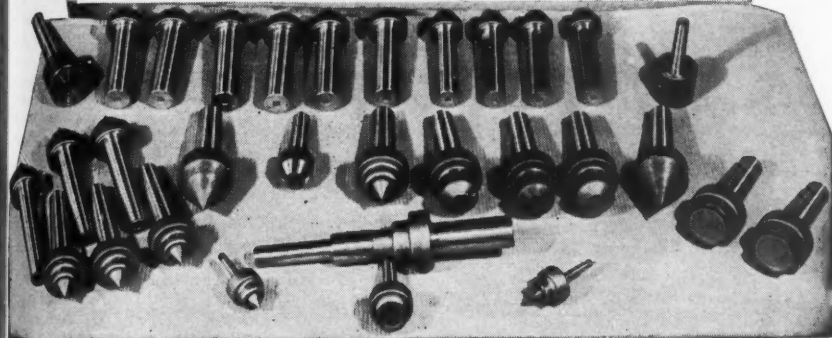
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ST. LOUIS, MO.

(In Canada: 444 Pacific Ave., Toronto, Ont.)

Characteristic of the design of all STURDIMATIC LIVE CENTERS is a low overhang and a slight cushioning action . . .

that compensates for expansion due to heat, shock and excessive thrust loads—reducing wear to a minimum. A properly engineered live center is one of the fundamentals of setting up a job and requires a specialist's experience . . . standard shanks with Morse taper carried in stock.

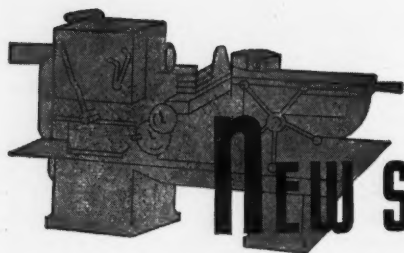


Send us your specifications and blueprints—We will see that your job is set up with the right LIVE CENTER—prompt deliveries on high priorities.

# STURDIMATIC

## TOOL COMPANY

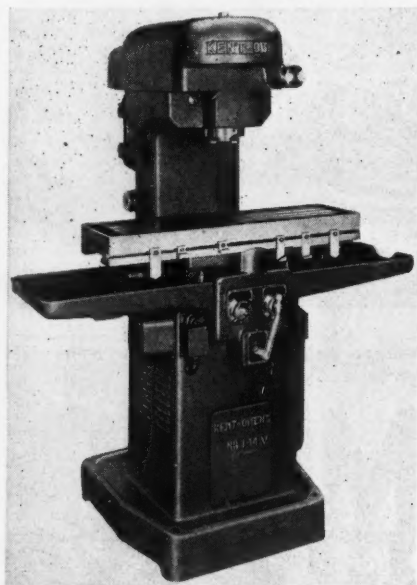
5222 THIRD AVE. DETROIT, MICH.



# NEW SHOP EQUIPMENT

## Kent-Owens No. 1-14V Vertical Milling Machine

Especially designed for use in performing rapid vertical milling operations, the Kent-Owens No. 1-14V Vertical Milling Machine shown here is now being marketed by the Kent-Owens Machine Co., 958 Wall St., Toledo, Ohio. The machine is provided with a simple, infinitely adjustable hydraulic table feed with full automatic cycle. Table movements are effected by a convenient control lever which indicates the direction of table movement. The graduated dials furnished are infinitely adjustable to



Kent-Owens No. 1-14V Vertical Milling Machine

provide any feed rate within a range of 1 to 40 inches per minute.

The table is provided with feed in both directions, rapid traverse in both directions, automatic shift from rapid traverse to feed in either direction, and automatic reverse at both ends of the stroke, thus practically any desired cycle can be obtained, such as milling work at one end of the table while unloading and loading work at the other end. Dogs can also be provided for intermittent milling. The box-type bed of the machine completely encloses the motor and hydraulic pump unit for actuating the table, which rides directly on ways of the bed.

The spindle head and head carriage of the machine are one-piece castings. The spindle head has a cross adjustment which is effected by means of a screw and micrometer dial, and moves on four narrow ways in the head carriage. The carriage is adjustable vertically on two ground cylindrical steel posts by a screw with micrometer dial.

Ten spindle speeds ranging from 12 to 300 r.p.m. are quickly available. The spindle is driven entirely by V-belts from a standard foot-mounted motor situated at the rear of the spindle head. Interchangeable V-belt pulleys are used with an intermediate adjustable pulley to provide full speed range and maintain belts in proper tension. Changes in spindle speed can be made by simply raising a hinged cover on the spindle head and properly setting the V-belts.

The Kent-Owens No. 1-14V Vertical Milling Machine can be equipped with either a one or two-way positive stop with dwell. With this arrangement, the work is fed into the cutter to a fixed positive stop where it dwells momentarily while the cut is cleaned out, after which the work is automatically withdrawn from the cutter. A convenient switch engages or disengages the positive stop as desired.

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## Michigan No. 861-4B Gear Finishing Machine

Designated as the No. 861-4B, a machine incorporating a crossed-axis principle of gear shaving for finishing small gears to high accuracies is announced



Fig. 1—Michigan No. 861-4B Gear Finishing Machine

by the Michigan Tool Co., 7171 E. McNichols Rd., Detroit, Mich. The machine is especially designed for finishing gears of less than 4-inch diameter and less than 1-inch face width, thus making it particularly suitable to the production of gears for instruments, control mechanisms, and similar precision devices in which high accuracy com-

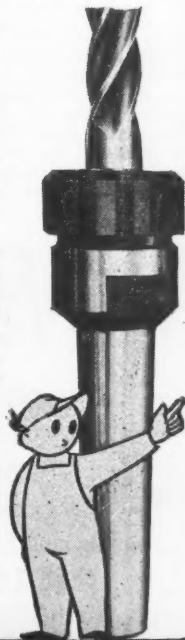


## UNIVERSAL FIRST COMPANY IN AMERICA TO WIN COV- ETED 20% BOND FLAG

When each of the 550 of us here at Universal helped give the Allied cause a boost by being America's first industrial plant to subscribe 20% for War Bonds we were mighty proud.

But we're even more proud of the big volume of precision built collet chucks we're turning out daily to help America's arms production.

The Universal collet chuck shown here has ground threads, ample room for tool feed out and is ideal for holding end mills, keyway cutters, drills, etc. Write for facts.



# UNIVERSAL

ENGINEERING COMPANY  
FRANKENMUTH, MICH.

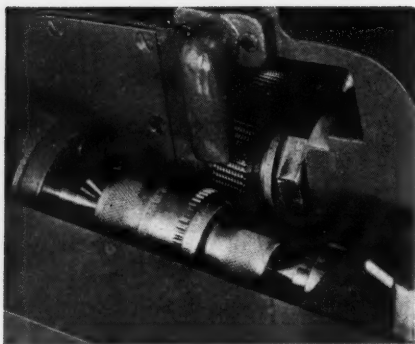


Fig. 2—Gear, mounted on quick-assembly mandrel, being finished on Michigan No. 861-4B Gear Finishing Machine

bined with correct tooth form, and also minimum backlash, are essential to successful operation.

Designed for mass production, the No. 861-4B machine is notable for the speed with which gears can be finished to high accuracies. It is automatic in operation, with combination cam and electric control simplifying and speeding produc-

tion of gears. In addition, the machine is so designed that a number of machines of this type may be installed on a single battery, with one operator taking care of several machines if necessary. For this purpose, the working mechanism of the machine is located entirely in the top casting.

In operation, the gear, which may be mounted on a specially designed mandrel or on its own shaft (6 inches maximum length), is placed in the machine between dead centers with hard metal tips. A serrated-tooth rotary cutter mounted on an axis at an angle so that of the gear engages and drives the gear first in one direction and then in the opposite direction to finish both tooth faces. During the cutting and infeed, the cutter also reciprocates back and forth across the face of the gear thus permitting the use of narrow cutters. Both the cutter cross feed and the infeed to the correct center distance are cam controlled.

Illustration Fig. 2 shows a gear mounted on quick-assembly mandrel, being finished on a Michigan No. 861-4B Gear Finisher. The tailstock at the right is provided with a single handle which not only pulls the right-hand center back for mounting of the mandrel and gear in the machine but also serves



## ...PRECISION GROUND!

These small semi-steel bench plates, precision ground to an accuracy of .0005-inch, are now available for many types of work, particularly inspection and assembly of small parts. They provide an accurate surface and are built for lasting strength and rigidity.

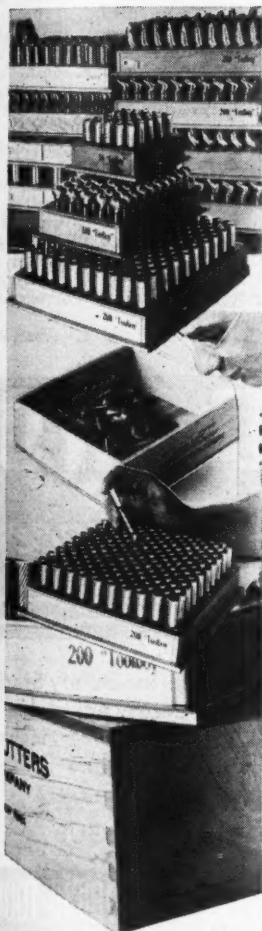
All four sides are machined at exact right angles to the top. Challenge Precision Ground Bench Plates are made in nine standard sizes, from 8x10 to 18x18 inches. Other sizes to order. Prompt delivery on standard sizes. Ask for prices and data.



**THE CHALLENGE MACHINERY CO.**

GRAND HAVEN, MICHIGAN, U.S.A.

# Announcing Our "Toolboy"



A Portable Toolcrib for Holding and Shipping Midget Milling Cutters Combining these Unique Features.

- ★ **3 Convenient Sizes**
- ★ **No Loss in Transit**
- ★ **Prevents Dulling**
- ★ **Easy to Handle**
- ★ **No Unwrapping**
- ★ **Easy Inventory**
- ★ **Capacity of Each**
- ★ **Lid is Receptacle for Dull Cutters**
- ★ **Strong Construction**
- ★ **Use Little Storage Space**
- ★ **No Cut Fingers**
- ★ **Full Credit Allowed When Returned.**

(Customer invoiced \$.75, \$1.00, or \$1.50 according to size.)

**SEVERANCE TOOL COMPANY**  
SAGINAW, MICHIGAN

#### BRANCHES

Long Island City, N. Y.    Los Angeles, Calif.  
Detroit, Mich.



a single movement to lock and unlock this center. The center is so designed that correct predetermined pressure is automatically obtained.

The Michigan No. 861-4B Gear Finishing Machine is designed to permit the finishing of various types and sizes of gears with a single cutter for each pitch and pressure angle. To adjust the machine for different sized gears, a small handle located on the front of the machine below the work centers is used. This handle is provided with a dial graduated to 0.0005 inch to correspond to the travel of the cutter head on its slide. Once the machine is adjusted for a given size gear and the proper cutter selected for the pitch of the gear, operation becomes entirely automatic. Limit switches and dogs are provided for reversing the machine during its operating cycle.

While 16 is the recommended maximum pitch of gears to be finished on the machine, small gears of such pitches as 32, 48, and 64 can also be finished. The machine is said to be equally adaptable to finishing gears of stainless steel, carbon steel, and nonferrous materials, including brass, bronze, fiber, and so on.

The machine is designed for use with cutters from 2 to 3 inches in diameter with maximum face width of  $\frac{1}{2}$  inch. Center distance between cutter and

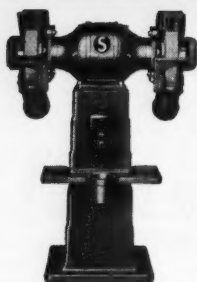
work spindles ranges from  $1\frac{1}{2}$  to inches, thus enabling gears of practically zero diameter to be finished on machine.

Machine controls are normally located on the right side of the base, as shown in Fig. 1. In the case of installation of machines in a battery, controls may be wall mounted. A cutting oil reservoir is enclosed in the base of the machine, an oil filter being provided to clean the coolant before reaching the cutter and work. Piping for the coolant is extended through the machine casting and is arranged so that flow is uninterrupted regardless of the angular position of the head carrying the crossed-axis cutter. A hinged lid is provided at the top of the machine to permit enclosing of the work during cutting to keep out dust and prevent splashing of the coolant.

Power for the infeed is provided by  $\frac{1}{4}$  h.p., 1,200 r.p.m. motor, while a reversible  $\frac{1}{4}$  h.p. motor operating at 1,200 r.p.m. is provided for the cutter drive. Drive to the cutter is through V-belts for quietness and flexibility. A graduated dial is provided on the rear of the machine casting to simplify adjustment of the cutter axis to the correct amount of cross-axis desired.

The Michigan No. 861-4B Gear Finishing

# It's STANDARD for War and Peace



## Type

24 FAS, 2 H.P., 12"x2"	Grinding Wheels
36 FAS, 3 H.P., 14"x2 $\frac{1}{2}$ "	Grinding Wheels
40 FAS, 5 H.P., 14"x3"	Grinding Wheels
50 FAS, 5 H.P., 18"x3"	Grinding Wheels

All equipped with Push Button Safety Starter, Safety Hinge Door Guards adjustable to wheel wear. The Standard line includes all types of Grinders, Buffing and Polishing Machines and Speed Lathes.

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The STANDARD ELECTRICAL TOOL CO.

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BURNS and EIGHTH ST.

# ROCKWELL" HARDNESS TESTER



*Precision — Speed — Adaptability*

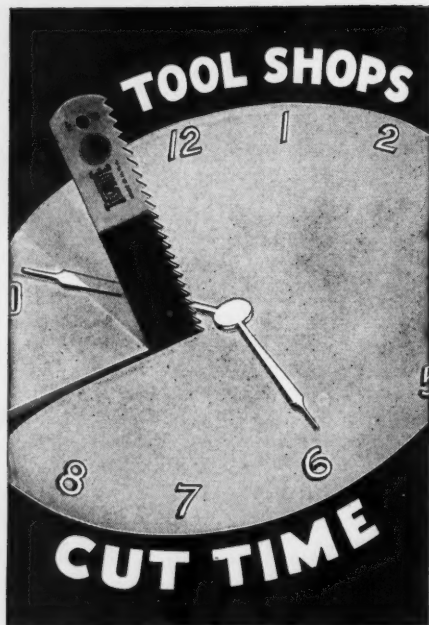
**In these testers you get Everything.**

Concord Ave. & 143rd St.  
New York

**WILSON**  
MECHANICAL INSTRUMENT CO. INC.

MODERN MACHINE SHOP 247

October, 1942



**SHOP A** (Penna.) saved one minute each cut on  $2\frac{1}{2}$ " tool steel bars.

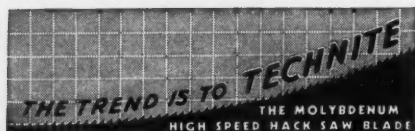
Time counts for this company, because in wartime many tool orders are rushed on a production basis.

**SHOP B** (Calif.) reports 62% more cuts.

This small tool company is owned by a prominent consulting engineer who tested hack saw blades thoroughly before switching to Capewell's Technite.

You, too, will find they cut faster, last longer. Order from your mill supply man.

# CAPEWELL



ing Machine proper is  $20\frac{1}{2}$  inches long x  $26\frac{1}{4}$  inches wide x 20 inches high, the base being designed to provide a working height of centers above floor of 4 inches.

## Linley Improved High Speed Vertical Milling Machine and Jig Borer

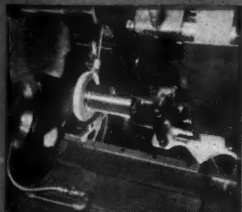
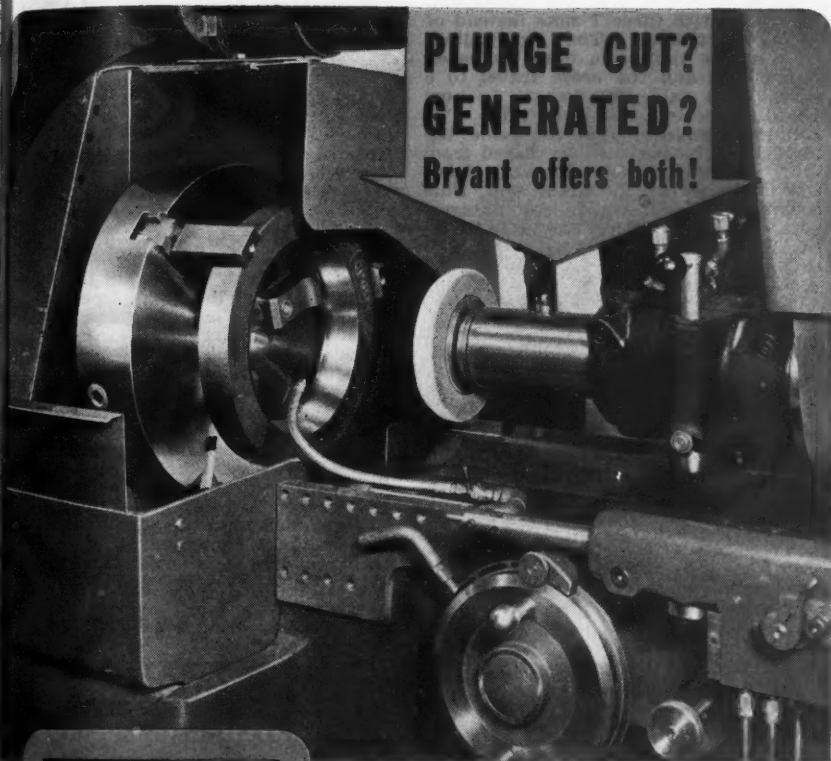
Improvements in the design of its high speed vertical milling machine and jig borer featured in the July, 1933 issue of MODERN MACHINE SHOP are announced by the Linley Bros. Co., 15 Montauk St., Bridgeport, Connecticut.

The table of the machine has been

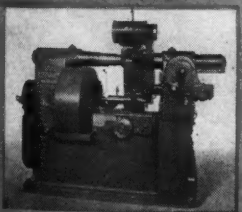


Linley Improved High Speed Vertical Milling Machine and Jig Borer

**PLUNGE CUT?  
GENERATED?**  
Bryant offers both!



View showing formed guide attached to wheel slide on No. 16 Bryant Grinder



No. 10-28" Bryant Internal Grinder

THE Bryant principle of overhead wheel slide suspension lends itself to the easy, profitable grinding of dies and similar parts.

A guide is used for controlling the wheel slide traverse to follow the work contour or for controlling the shape of the wheel if the plunge cut method of grinding is preferred.

The first, or generating, method has been favored by many manufacturers of dies due to assurance of smooth blended curves and freedom from rings left by the abrasives.

The plunge cut method is much the faster method due to the larger area of contact of the grinding wheel.

Which method will best suit your requirements? Our engineers and field men will gladly help in solving your problems.

**BRYANT CHUCKING GRINDER CO.**  
SPRINGFIELD, VERMONT, U. S. A.

increased in size to 7 x 17½ inches and is provided with three T-slots instead of one as heretofore. The longitudinal travel of the table has been increased to 10 inches and the cross travel to 6 inches. The table handwheel is now located at the left of the machine. The maximum distance from the table top to spindle nose has been increased from 9 to 11½ inches. Column ways have been shortened at the lower end, thus providing more clearance for fixtures, and so on, on the table. The table thickness has been increased by ½ inch to provide greater rigidity.

Complete specifications of the Linley Improved High Speed Vertical Milling Machine and Jig Borer are as follows: table size, 7 x 17½ inches; number of T-slots, 3, width of T-slots, ⅝ inch; longitudinal travel of table, 10 inches; cross travel of table, 6 inches; top of table to spindle end, 11½ inches maximum; movement of sliding head, 8 inches; quill travel, 3 inches; spindle center to column ways, 5¼ inches; spindle center to column below ways, 6¾ inches; spindle speeds, 275, 430, 550, 860, 1,250, 2,125, 2,500, 4,250 r.p.m.; collet capacity, ½ inch; height from floor to table top, 35½ inches; height over pulleys, 62 inches; horsepower required, ½; floor space, 18½ inches wide x 20 inches deep; shipping weight, 900 lbs.

## Hammond Model 20-S Wet Tool Grinder

Illustrated herewith is the Hammond Model 20-S Wet Tool Grinder which has been announced by Hammond Machinery Builders, Inc., 1615 Douglas Ave., Kalamazoo, Mich. The machine is heavy, streamlined construction and said to be useful for grinding all hard metals, alloys, and tungsten carbide.

Features of the machine include an improved tool rest and wheel dresser. The tool rest is adjustable to any desired angle and has a replaceable sliding wearing plate. The wheel dresser, which is an integral part of the assembly, provides a quick, easy method for dressing the face of the grinding wheel. The entire assembly is adjustable in and out from the wheel by means of a detachable hand crank which actuates a protected screw mechanism. A convenient regulating valve located in the splash pan to the right of the tool rest provides quick, easy regulation of coolant flow to grinding wheel. The detachable splash guard shown in phantom across the front of easy-to-clean sludge pan said to provide added protection to the operator.

The 3 h.p., totally-enclosed, fan-cooled

# WILLEY'S

## GENERAL PURPOSE TUNGSTEN CARBIDE TOOLS

You can handle 90% of your requirements with Willey's General Purpose Tungsten Carbide Tools, which are suitable for machining cast iron, tough hard rubber, bakelite, fibre and tough alloy steels.

Willey's General Purpose Tools give you low prices, increased production and lower operating costs. Prompt deliveries on these standard tools.



New Catalog  
Just Out  
Write Today!

# WILLEY'S CARBIDE TOOL CO

1340 W. Vernor Highway, Detroit, Michigan

# FOR SALE GRINDERS

(Delivery 4 Weeks\*)

## DESIGNED FOR ★ ★ ★

★ External, internal, face, angle,  
or straight finish grinding AND  
rough turning!

★ Face Jobs—up to 30" diameter.

★ Internal Jobs—straight or  
taper up to 30" diameter.

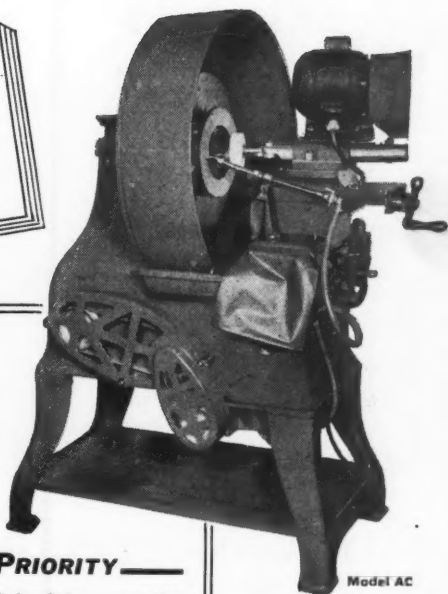
★ External Jobs—up to 27"  
diameter.

## Precision Work . . .

Hand-scraped, dove-tailed ways  
with adjustable tapered gibs for  
cross-slide and carriage. Quick-  
change 80 or 130 RPM work  
speeds and variable quill speeds.

★ At Time This Ad Was Written

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PRODUCTS · INC.  
BEDFORD · OHIO · U.S.A.  
ESTABLISHED 1919



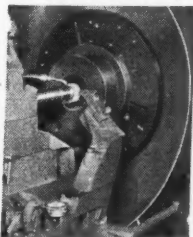
Model AC

**\$1200**

F. O. B. CLEVELAND

## PRIORITY —

Priorities can be  
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## AUTOMATIC SIZING DEVICE..

Foolproofs production  
runs! Duplicates  
size on successive  
pieces precisely!  
Saves lots of time, too!

## SEE ONE WORK — MAIL COUPON

Lempco, Dept. MM Bedford, Ohio  
GENTLEMEN: Tell me plant nearest me where  
I may see a LEMPCO Grinder in operation.

NAME .....

ADDRESS .....

CITY ..... STATE .....





## END MILL ARBOR

S. & A. End Mill Arbors are made of steel, unhardened, carefully fitted, accurately sized and are well known for their durability.

No. of Arbor	Taper	A	B	C	D	Net Price Each
EA 10	MORSE No. 2	1 1/2"	4 1/2"	1-1/16"	3/8" & 1/2"	\$5.00
EA 11	MORSE No. 3	1 3/8"	4 3/4"	1 1/4"	3/8" & 1/2" & 5/8"	\$5.50
EA 12	BROWN and SHARP No. 7	1 1/2"	4 3/4"	1-1/16"	3/8" & 1/2"	\$5.00
EA 13	BROWN and SHARP No. 9	1 3/8"	5 7/8"	1 1/4"	3/8" & 1/2" & 5/8"	\$5.50
EA 14	BROWN and SHARP No. 18	1 3/4"	7 3/4"	1 1/4"	3/8" & 1/2" & 5/8"	\$6.00

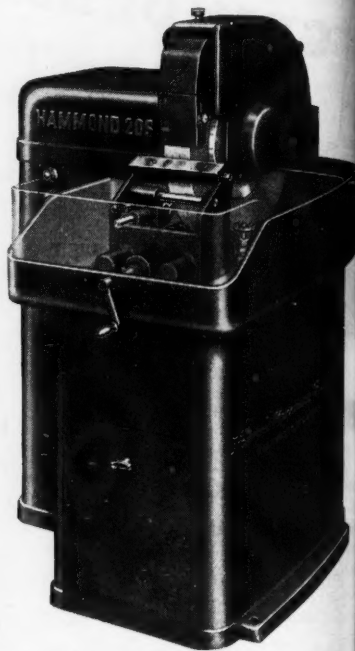


**SCHULTZ & ANDERSON CO.**  
MACHINE TOOLS

109 EDISON PLACE NEWARK, N. J.

motor used to power the Model 20-S grinder is located in the base of the unit and is provided with a push-button starter located high at the side of the machine. The starter is of the magnetic type with overload, low voltage and phase failure protection.

The grinding wheel furnished with the Hammond Model 20-S Wet Tool Grinder is 20 inches in diameter by 2 1/2-inch



Hammond Model 20-S Wet Tool Grinder

and is provided with a 9-inch hole for mounting on a large hole wheel flange. A heavy cast wheel hood with hinged cover provides for easy and quick wheel changes. By merely removing two Allen cap screws, the hinged cover can be swung out of the way, thus giving complete accessibility to the wheel.

The design of the Model 20-S grinder also permits the use of an 8 x 8-inch table with tilting mechanism. The table tilts on hardened pivot pins with oil-bronze bushings by merely flipping convenient locking levers on the sides. The entire table assembly can be moved in and out from the grinding wheel by means of a detachable hand crank actuating a protected screw mechanism.

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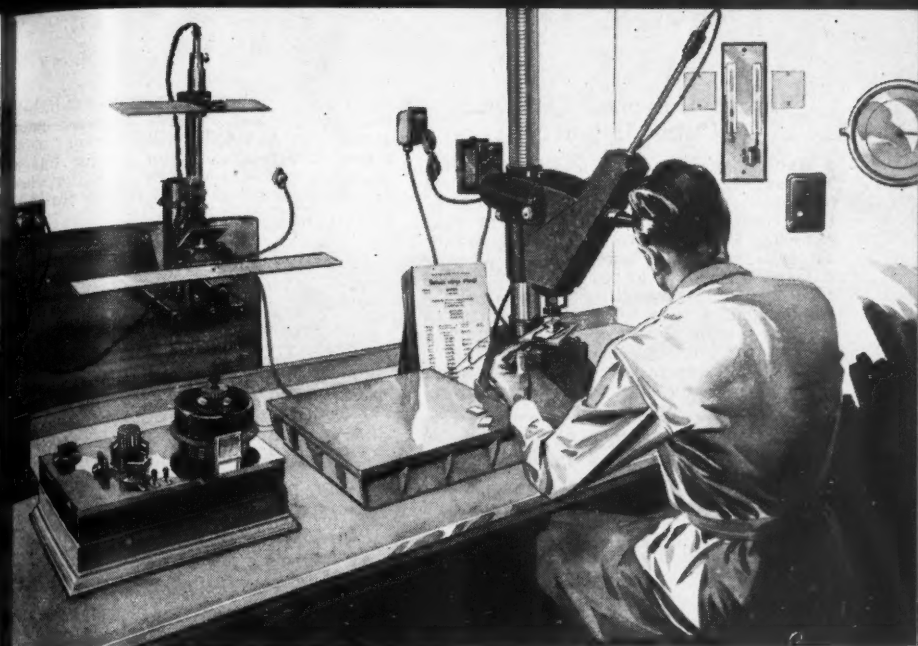
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## HE'S WORKING AGAINST *Infinity!*

Most inspectors work to specified tolerances of .001 — .0001, etc.

Not the one you see above. He's inspecting WEBBER GAGE Blocks and he's working against infinity!

For example the instrument he is using is only one of many required in testing Webber Gages. The room in which he works is kept at a constant temperature and humidity by means of thermodynamic control. Room temperature is charted by a recording thermometer on the wall. A wet and dry bulb thermometer indicates humidity. The gage being inspected and the master gage temperatures are being recorded by means of potentiometer and galvanometer as shown.

to meet wartime demands WEBBER'S entire productive capacity is being devoted to manufacture of GRADE GAGE BLOCKS only.

Every gage block he helps to produce is guaranteed accurate within .000004" (4 millionths of an inch)—every gage block is checked under perfect conditions with every known precision instrument. But that's not good enough!

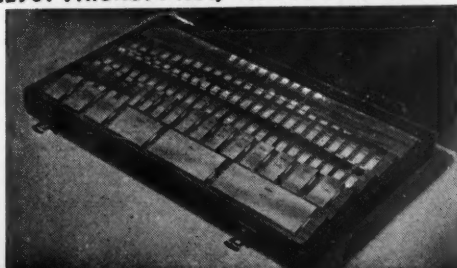
Webber "technicians in precision" are constantly striving to achieve absolute perfection—and perfection in gage blocks is measured against infinity. Today Webber's every resource in experience, manpower and ultra-modern manufacturing facilities is being thrown into the task of meeting war-

time demands for gage blocks. Although quantity is being fantastically increased, quality is being improved. We're still working against infinity! Write for full descriptive bulletins.

# Webber

## GAGE COMPANY

12901 TRISKETT RD., CLEVELAND, OHIO



Prompt delivery to firms furnishing necessary priority certificates. Prices for Set No. 81A —\$350.00 Set No. 40A —\$185.00.

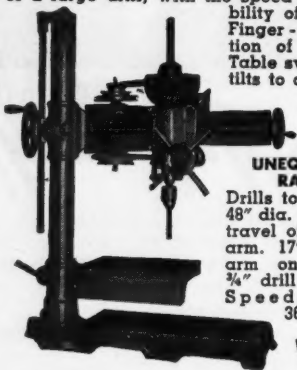
## Vernon Universal Tool and Cutter Grinder

Machinery Mfg. Co., 1915 E. 51st St., Vernon, Los Angeles, Cal., announces the addition of a universal tool and cutter grinder to its Vernon line of machines. Designed for use in grinding all types of tools, cutters and cylindrical work as well as for performing internal grinding operations, the machine is provided with a capacity for work up to 10½ inches in diameter and has a maximum longitudinal travel of 17¼ inches. Maximum work length between

right and left-hand tailstocks, 16 inches; maximum work length between headstock and tailstock, 13½ inches; maximum distance between center line of work and center line of grinding wheel spindle, 10 inches; transverse travel

## MUNDING BENCH RADIAL DRILL

Combines the convenience and accuracy of a sensitive drill, the range and capacity of a large drill, with the speed and flexibility of a radial. Finger-tip selection of speeds. Table swivels and tilts to any angle.

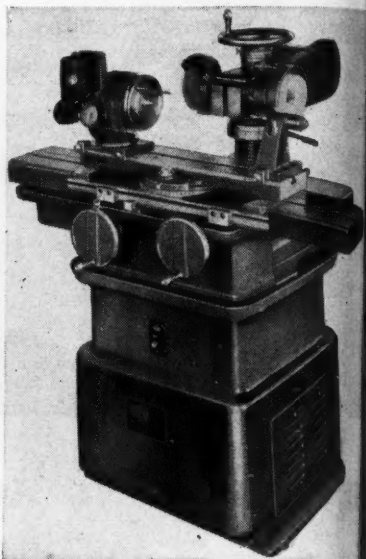


### UNEQUALLED RANGE

Drills to center of 48" dia. circle, 18" travel of head on arm. 17" travel of arm on column. ¾" drill capacity. Speeds: 175 to 3675 r.p.m.

Write for details.

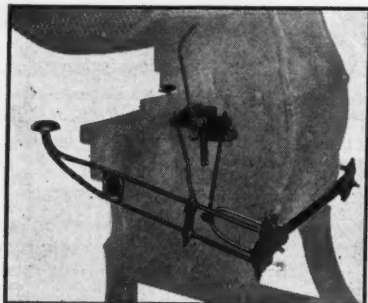
**MUNDING MFG. CO.**  
703 East Colorado Blvd. Glendale, Calif.



Vernon Universal Tool and Cutter Grinder  
Equipped for External Grinding

column, 7½ inches; vertical movement of wheel spindle, 6 inches.

The spindle head of the machine is powered by a ½ h.p., 60 cycle, 3 phase 3,450 r.p.m., ball bearing motor. The head can be swiveled 360 deg. on the column in a horizontal plane and is pro-



## SAFETY EQUIPMENT FOR POWER AND FOOT PRESSES

Combination Gate and Barrier Guards  
Two-Hand Safety Starting Devices  
Sweep Guards... Single-Stroke Attachments  
Treadle Guards... Fly Wheel Guards, etc.

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**JOHN HUMM SAFETY EQUIPMENT CO.**  
251 SHEFFIELD AVE. BROOKLYN, N. Y.

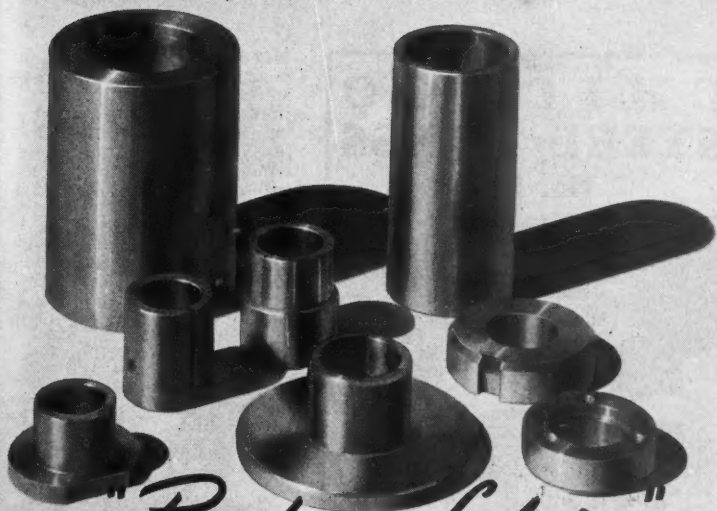
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BRONZE



## Specify *"Buckeye Lubrico"....* the high lead bearing for exacting service

• Buckeye's "Lubrico" are exceptional quality high lead bearings. They combine reduced co-efficient of friction, excellent conformity to the shaft to overcome slight misalignments—and qualities of self-lubrication in event of lack or failure of regular lubricant supply—yet cost but little more than bearings of standard analysis.

Because of their physical characteristics "Lubrico" bearings are ideally suited for use in airplane services, in pumps, as seal rings, and in other cases where freedom from shaft scoring and long service are desired.

The outstanding performance of

these bearings results from Buckeye's skilful, experienced and painstaking manufacture. Through the use of virgin metals only, impurities in Lubrico bearings are held to negligible limits, and the complete laboratory and metallurgical control maintained over charging ratios, melting and pouring temperatures, and all other manufacturing processes assures the production of an exceedingly high quality of product—free from porosity—each piece of which month after month measures up fully to Buckeye's exacting specifications. No order is too big or too small for Buckeye.

# *Buckeye*

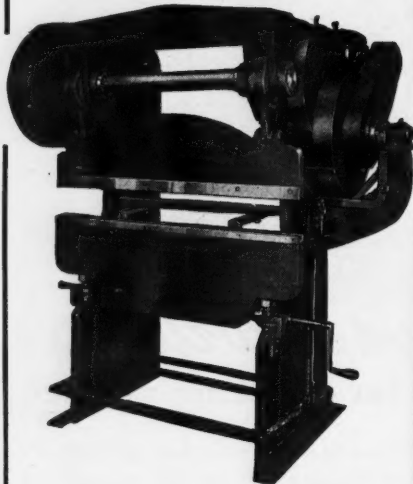
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BRONZE SLEEVE BEARINGS • STANDARD SIZES OR TO CUSTOMERS' BLUEPRINT  
IN ANY RECOGNIZED BEARING METAL ANALYSIS

# CHICAGO STEEL PRESS

No. 253



## SPEED WAR PRODUCTION OF SHEET METAL WORK

USE FOR...

1. FORMING
2. EMBOSSING
3. MULTIPLE PIERCING
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of Ammunition Cases, Bomb Box Liners,  
Bomb Fins, Aircraft Parts and Many  
Other Offense Products.

The No. 253 CHICAGO STEEL PRESS is accurate, compact, and ruggedly constructed of highest quality materials. Sizes 4, 5 and 6 ft. capacities up to 10 gauge.

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**DREIS & KRUMP MFG.  
Company**

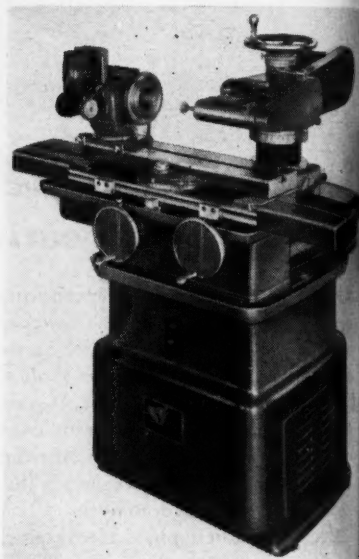
7418 LOOMIS BLVD.

CHICAGO

ILLINOIS

vided with two locks for clamping position. The 2-inch diameter external spindle is mounted on anti-friction bearings and has a  $\frac{1}{2}$ -inch shaft size at the wheels. The internal spindle is of similar construction but is designed to accommodate the higher speeds necessitated by smaller wheel sizes. Three external speeds and two internal speeds are provided.

The column is  $5\frac{1}{2}$  inches diameter and is protected against abrasives and splash by an accordion Neoprene boot. Elevation is accomplished by rotation of a large handwheel driving a 10 pitch



Vernon Universal Tool and Cutter Grinder  
Equipped for Internal Grinding

$1\frac{1}{4}$ -inch O.D. Acme screw operating a special bronze nut that has a backlash adjustment.

The column housing has extremely long ways, one being a  $1\frac{1}{2}$ -inch V-way and the other a 2-inch wide flat way. Wide spacing of the ways prevents overhang of any part of the column housing. Ways are protected against abrasives and coolant by guards.

The bed of the machine is of channeled grained cast iron and is provided with hardened steel ways; two V-ways are provided on the table and one V-way and one flat way on the bed. Ball bearings in bronze spacers between table



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## DESIGN FOR VICTORY

Unfailing performances of all JACOBS CHUCKS assure the maintenance of speedy metal working operations. Complete confidence in these fine tools is justified by exclusive Jacobs designs for more strength, closer accuracies, better gripping powers, longer wearing qualities. Their application to America's production efforts means speed . . . and speed means Victory! The Jacobs Manufacturing Co., Hartford, Conn.

IF IT'S A JACOBS ★ ★ ★ — IT HOLDS!



and bed ways impart a very smooth, sensitive table action.

Table longitudinal movement is effected through a V-belt located under the table in a well protected position. The belt is adjustable. Table movement is imparted through a handwheel at the front right side of the machine or through a smaller handwheel located at the rear of the machine. The front handwheel, when placed in the inner position, produces a rapid traverse and when in the outer position, a feed rate. Transverse movement of the column is obtained through a handwheel on the left side of the bed. Table construction consists of a sub-table and table. The latter can be swiveled 45 deg. in either direction on the sub-table and rigidly locked. Table dimensions are  $5\frac{1}{2} \times 28$  inches. A single  $\frac{1}{8}$ -inch T-slot is provided in the table top and on the table face, the face T-slot being equipped with special spring-loaded adjustable stops.

Standard equipment of the Vernon Universal Tool and Cutter Grinder includes a universal tooth rest, plain head and footstocks equipped with No. 2 Morse centers, and universal workhead. Two types of wheel dressers are available; a bracket type for face dressing

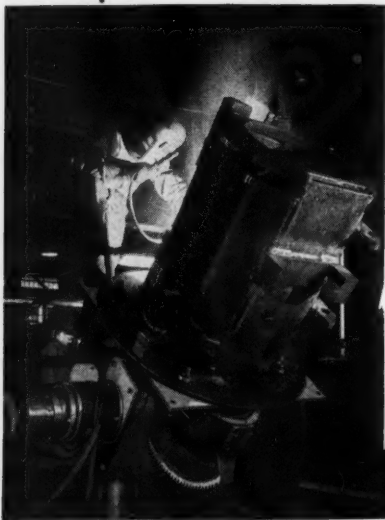
which mounts on footstock housing and is standard equipment, and a universal dresser for dressing concave, convex straight face, and vee forms.

## Kux Model No. 74 Automatic Press

Designated as the Model No. 74, automatic press for producing parts from powdered metals and ceramic materials has been introduced by the Kux Machine Co., 3944 W. Harrison St., Chicago, Ill. Oilless bearings, iron gears and cams, metal filters, and metallic electrical contact points are among the products which can be formed on the press from powdered iron, bronze, aluminum, platinum, and so on. Ceramic parts such as radio tube bases, insulators of all types, coil forms, fuse plugs and so on, can be easily and simply made from steatite, porcelain, and other ceramic materials at a rate of up to 20 pieces a minute.

The design of the machine permits the manufacture of odd shapes or parts with complicated cored holes, protruding lugs, and various sectional thicknesses to micrometer accuracy. The

## WELDS ALL SIDES DOWN - HAND WITH ONLY ONE SET - UP



Place the weldment, regardless of size or shape, on a C-F Positioner. "Tack" it to the table and the welder can finish the job alone—can weld all sides down-hand without further crane work or jacking-up. With a C-F Positioner the weldment itself rotates, twists and turns the heaviest and most cumbersome weldments with a push button control—can lay every fillet down-hand, assuring stronger, smoother, flawless welds "all over" easily and quickly.

Only the universal, multi-purpose C-F Positioner, both portable and stationary, are pedestal-mounted. The entire positioner can be rotated on its base to give maximum floor clearance or can rotate full 360° and tilts to 135° from horizontal.

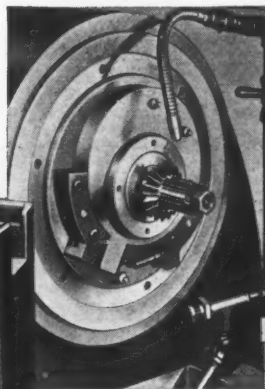
Hand or power operation from 1200 lb. capacity up. Write for new bulletin WP 22.



**CULLEN-FRIESTEDT CO.**  
1311 S. KILBOURN AVE.  
CHICAGO, ILLINOIS

# PRODUCE PRECISION Internal or External THREADS... FASTER

Below is shown set up for internal threading, the milling hob is revolved eccentrically about the work and simultaneously rotated into the work for the full depth of the thread. The cutter then rotates on its own axis and is carried around the work and simultaneously advanced by means of a lead screw to produce the desired helical thread.



*with the*

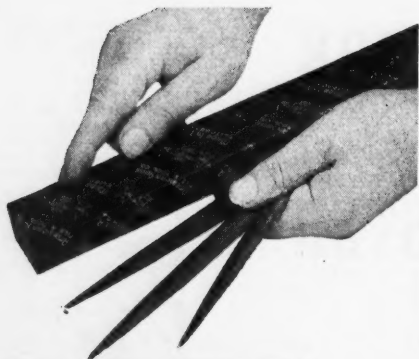
## NEW MURCHEY No. 32 THREAD MILLING MACHINE

Featuring a unique eccentric milling action described above, the new Murchey Thread Milling Machine is setting new records for speed and precision in the production of munitions threads. For example, on one job it is cutting a 2-7/16" thread in the base end of anti-aircraft shells faster than one a minute! Internal or external threads from 1" to 4" in diameter and up to 3" in length. Maximum efficiency in operation is obtained through the completely hydraulic work cycle and the Reeves variable speed drive which permit the selection of exactly the right speed and feed for every job. And in the cutting of deep, coarse threads, the heavy box-type bed and the keyway in the fixture table help to maintain rigidity and perfect alignment. If you are looking for increased speed and maximum accuracy in munitions and aircraft threading, let us send you further details of the latest Murchey thread production equipment.

Below is shown the spinning nose equipped with a hardened and ground 12-tooth thread milling head adapted for cutting external threads from 1" up to and including 4" in diameter. The eccentric milling action is employed as in the production of internal threads described above.

• We also manufacture all types of Collapsible Dies, Self-Opening Die Heads, Bolt and Pipe Threading Machines and Pipe Cutting-Off Machines.

THE MURCHEY MACHINE & TOOL COMPANY  
951 PORTER STREET, DETROIT, MICHIGAN



## FILES *for* the national war effort

"Give us good tools and we will do the job" say the war workers in thousands of plants all over the country.

"American Swiss" Swiss-Pattern Files are the kind of precision tools they need for hand - finishing operations. These files assure accurate work . . . and long-continued use with maintenance of original keenness. These characteristics, which have distinguished "American-Swiss" files for over 40 years, explain their wide preference by tool and die makers and machinists.



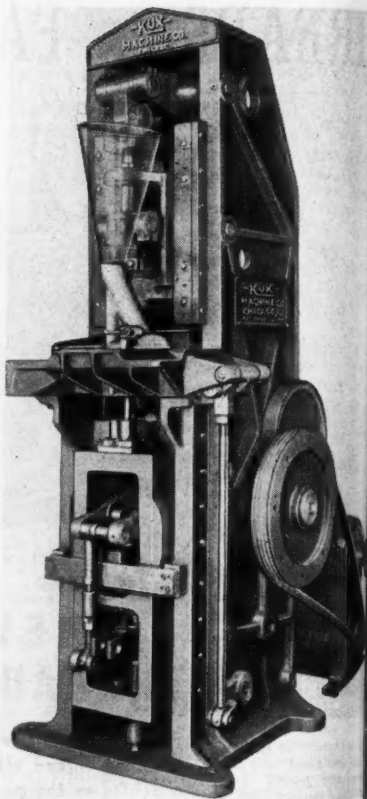
American Swiss File & Tool Co., Elizabeth, N.J.

# AMERICAN SWISS

**FILES OF PRECISION**

formed pieces are said to be made with uniform structural density throughout.

The Kux Model No. 74 Press is completely automatic in operation, an occasional filling of the supply hopper containing the powdered material being all that is required for continuous operation. Designed to apply up to 50 tons total pressure, the machine is said to



Kux Model No. 74 Automatic Press

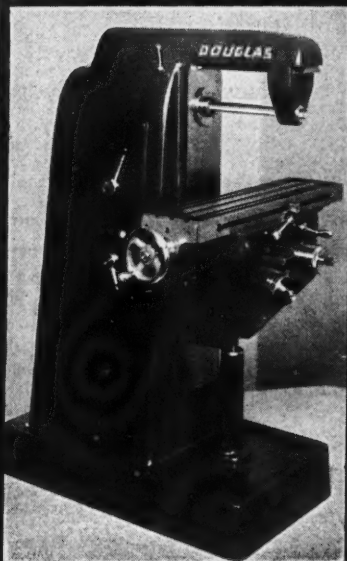
produce parts up to 5 inches maximum diameter and has a powder cell or fill of 5½ inches maximum. Massive built for the safe withstanding of the high pressures necessary for this type of work, the Model No. 74 has a one piece steel cast main frame which stands 11 feet high. The total weight of the press is approximately 13,500 pounds.

An agitated feeding shoe transmits the material from the supply hopper to the

**DOUGLAS**

**PLAIN  
MILLER**

**FOR SMALL PARTS PRODUCTION**



**WIDE RANGE OF  
SPINDLE SPEEDS from  
75 to 1200 R.P.M.**

**TABLE SIZE  
32" x 8"**

**QUICK DELIVERY  
BY LARGE SCALE PRODUCTION**

**DOUGLAS MACHINERY CO. INC.**  
150 BROADWAY NEW YORK, N. Y.

powder cell in the die. The die fill, which is controlled by an adjustment device, can be increased or decreased at will so that wafer thin parts or parts with thick section can be produced. Once set, the die fill is held to the exact quantity of material desired through the use of a patented overfill cam mechanism.

Built for the use of multiple telescoping punches and movable core rods which apply the pressure to the material being formed, the Kux Model No. 74 Automatic Press is designed with separately controlled mechanisms for operating each individual telescoping punch or core rod. The pressure applied by each of the punches and movable core rods is individually controlled and adjusted at the front of the machine.

The use of upper and lower movable core rods permits the forming of intricate and odd shaped parts, since additional pressure can be applied to an extending lug, countersunk hole, or heavy section where such pressure is required to obtain uniformity of density. The lower movable core rod mechanism is also necessary for proper ejection of the formed part from the die cell to eliminate breaking or cracking. A side core pull mechanism is also provided so that parts having holes or in-

dentations through one of their sides can be formed.

The die in which the formed piece is made is locked in a table, which is mounted on an extension of the main frame. Thus, all pressures exerted on the die are absorbed by the massive main frame itself.

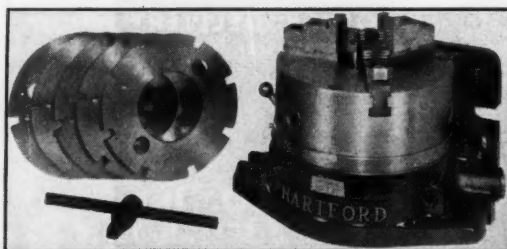
Both upper and lower punches are held in flange type punch holders and are mounted on heavy steel punch carrying slides which operate in V-grooves that are adjustable for wear. Both punches can be shifted slightly for perfect alignment with the die. Movable core rods are connected to separate operating mechanisms, while all stationary core rods are held in place by a stationary core bracket fastened to the main frame directly below the lower punch.

### Elmes Horizontal Hydraulic Pump

The illustration shows a six-plunger fully enclosed, horizontal hydraulic pump which is now being manufactured by the Charles F. Elmes Engineering Works, 216 N. Morgan St., Chicago, Ill. All moving parts of the pump are pro-

## For SPEEDING UP Indexing and Chucking

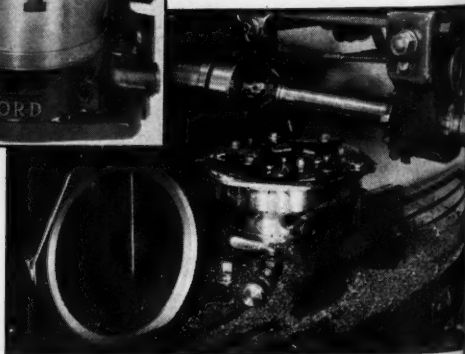
The HARTFORD "Super-Spacer" is more rigid and more rapid in operation than the conventional dividing head. It can easily be set up for one piece or thousands. Interchangeable mask plates make errors impossible on divisions of 2, 3, 4, 6, 8, 12 and 24.



Write for complete specifications and illustrations of milling, drilling, grinding, jig boring, planning, slotting and boring operations.

**THE HARTFORD  
SPECIAL MACHINERY CO.**  
HARTFORD • CONNECTICUT

"Super-Spacer" with faceplate is shown straddle milling the hexagonal end of aeronautical engine part. Location plug to fit bore of work is straddle faceplate.



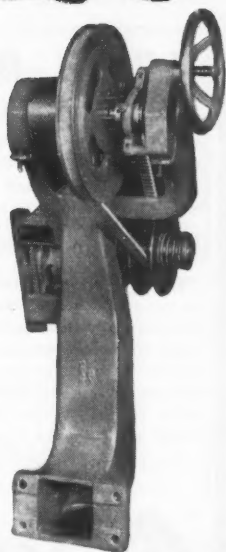
THAT EXTRA PRODUCTION  
KEEPS CROWDING JOE  
OUTA THE SHOP!



ARE you swamped with work and tearing your hair for more production? Then see this Given Vari-Speed Drive!

Old tools all over the country are often doubling original output with the Given . . . they're 30% faster on spindle speeds . . . they handle easier and more quickly in changing speeds. They're far more flexible on special operations where gradual speed increase or decrease is required. And it's no lengthy job to convert to a Given—just drill and tap four holes, bolt the special bracket in position and turn on the switch!

Brackets are available for all machines. Sizes range from 1 to 10 h.p. We will gladly furnish recommendations for your particular machine tools if you send us a list. Write us today!



**Given VARI-SPEED DRIVE**  
GIVEN MACHINERY CO., 3855 SANTA FE AVE., LOS ANGELES





Elmes Horizontal Hydraulic Pump

sure lubricated, and connecting rods operate in a continuous bath of oil. Roller bearings are used throughout the construction of the unit.

Particularly adaptable for accumulator system, the Elmes Horizontal Hydraulic Pump has a maximum capacity of 400 h.p. and is driven by means of herringbone gears running in a continuous bath of oil. The pump is available with built-in by-pass valves or safety valves, as desired. All parts are finished for long service and hard wear.

## "Flo-Bac" Coolants

A line of quality metal cutting coolants has been developed by the Gray-Mills Co., 121 W. Ontario St., Chicago, Ill., enabling their nationwide distribution outlets to offer immediate delivery from stock. Realizing the inconvenience to many shops in purchasing large quantities, the Gray-Mills "Flo-Bac" coolants are offered in a wide range of container sizes: 3, 5, 15, 30, 50, and 100 gallons. They are manufactured in five types to cover practically every requirement and are available in wooden containers (to conserve steel and expedite shipments) on priorities up to A-10. Since containers require A-1-J or better.

Their new "Flo-Bac" coolants, combined with the new Gray-Mills Portable Coolant Systems, make it possible for the Gray-Mills Co. to offer a complete service on cutting fluids.

Their new "Flo-Bac" coolants, combined with the new Gray-Mills Portable Coolant Systems, make it possible for the Gray-Mills Co. to offer a complete service on cutting fluids.

## ACME MONOCHROMATIC LIGHT

with ACME GLASS OPTICAL FLATS simplifies Ultra-Close Measurement

★ Where light wave measurement is used to determine the flatness of surface areas, and where optical flats are used as comparators, light of a single wavelength is required.

### INCREASES THE VALUE OF YOUR OPTICAL FLATS

The large bright working field of the Acme Monochromatic Light avoids the necessity of exact placement of the work, and makes inspection easy and fast. Interference bands can be seen on a relatively dull surface or through an appreciable air gap. This decreases scratching and wear of your glass flats as it is unnecessary to rub them down on the work to squeeze out the air film.

For better, faster light-wave measurement, order the Acme Monochromatic Light today!

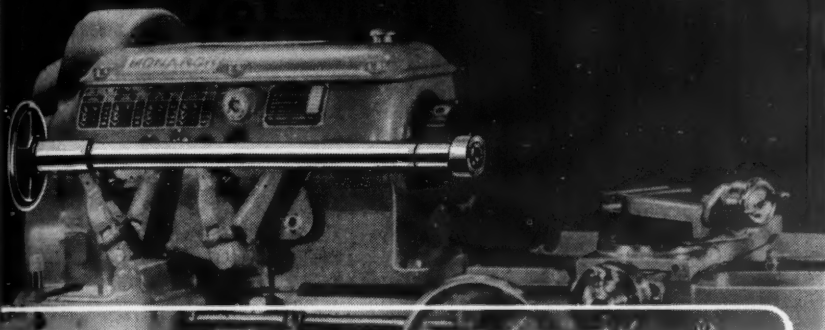


## ACME INDUSTRIAL COMPANY

Makers of Hardened and Ground Precision Parts  
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You can get a "fourth shift" on your lathes, and unskilled operators can turn out more accurate work, with Sutton drawbars, adaptors and interchangeable collets. Instead of using short length bars you save time by handling full length round, hex or square stock on every machine. And because precision is built into the collet, rather than dependent on the operator, you get better work as well as more of it.

Your Sutton Representative will gladly get the necessary data, and quote you

on the complete installation. Or you can write Sutton Tool Co., 2895 W. Grand Blvd., Detroit.

- ★ COLLETS      ★ FEEDERS
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for lathes ... milling machines ...  
hand and automatic screw machines

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**REALLY HIGH-SPEED GRINDER**  
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**KIPP<sup>air</sup> GRINDER**

**NOW THE NEW MODEL**  
**H**  
**KIPP<sup>air</sup> GRINDER**

Madison-Kipp tool-makers originated the first really high speed grinder. They know a great deal about the practical side of grinder design and grinder usage. They think the new Model H is the best all around off-hand tool they have ever tried and we are sure you will agree with them. It's fast (50,000 R.P.M.), more powerful, and has a handier grip.

If you are doing priority work, Order Today!

Please attach preference rating certificate with order.

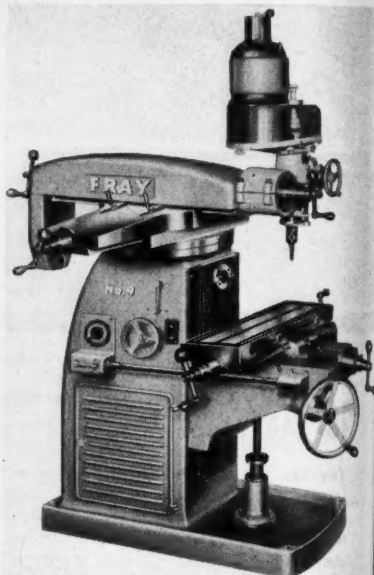
**\$ 29<sup>75</sup>**

**MADISON-KIPP CORPORATION**

208 Waubesa Street, Madison, Wisconsin, U. S. A.

## Fray No. 9 Ram Type Milling Machine

Particularly suited to toolrooms and shops having a wide variety of operations to perform, the Fray No. 9 Ram Type Milling Machine illustrated here with has been brought out by the Fray Machine Tool Co., 503 W. Windsor, Glendale, Cal. The machine is designed for performing operations at any angle or compound angle, since it is both a horizontal and vertical type miller. Operations performed by the machine in-



Fray No. 9 Ram Type Milling Machine

clude jig boring, slotting, drilling, tapping, keyway milling, end milling, profile milling, diesinking, plastic molding, routing, serrating, spot-facing, counter boring, punch forming, and spline milling.

For horizontal milling, the turret head can be reversed and the vertical attachment swung back out of the way. Operations are performed longitudinally by traversing the ram on the turret and crosswise by operating the ram on its saddle. The ram has a cross travel of 10 inches and a longitudinal travel of 18 inches.

The No. 9 ram type miller is normally furnished with a Fray Type E mill-

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# Heat Treatments

## MUST HIT THE MARK TOO!

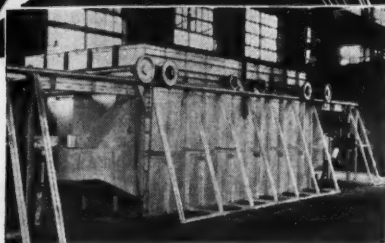


Illustration at left shows MAHR Recirculating, Semi-Pit Type, Stress Relief Furnace for stress relieving of weldments, etc., in the production of gun mounts and similar ordnance parts.

**RAIDERS!** Two or three miles up—flying 300 miles an hour or better! Knocking bomber or fighter planes out of the sky requires the utmost in precision manufacture and split-second aiming of the "ack-acks".

Obvious indeed is the need for accurate heat treatment of the exact type needed for gun barrels and gun mounts. The barrels must withstand the intense heat and tremendous explosive power of rapid firing. Mounts are subject to most violent strains and vibrations.

MAHR Furnaces are successfully "hitting the mark" with every type of heat treatment needed for gun barrels and mounts, planes, tanks, warships. MAHR Furnaces have *proven* their merit in thousands of wartime and peacetime applications.

**A MAHR ENGINEER CAN HELP YOU** on any heat treating problem . . . Write, wire or phone today.

### MAHR MANUFACTURING CO. Div. DIAMOND IRON WORKS, INC.

General Offices: Minneapolis, Minnesota  
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A Battery of MAHR Car Type Furnaces, made in double and single end type for normalizing and annealing of gun barrels—90 mm. to 155 mm.



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ANNEALING, CARBURIZING, BAKING,  
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STRESS RELIEF.

#### Furnace Types:

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PIT  
PUSHER  
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POT  
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Equipment:  
RIVET FORGES  
TORCHES  
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SMITHING FORGES

### MAHR FURNACES

Throw your "SCRAP"  
into the fight—NOW!

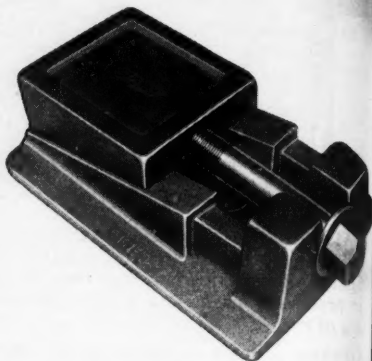
head, the 1 h.p. motor of which may be swung completely around the housing and locked at any point. The head is arranged so that instant change from micrometer wheel feed to hand lever feed can be made. The spindle of the head has a travel of 4 inches and is available with either No. 9 Brown and Sharpe or No. 3 Morse taper.

The horizontal spindle of the Fray No. 9 Ram Type Milling Machine is provided with a National standard No. 40 taper and is driven by means of a Frayco 3 h.p. motor located in the base. The table of the unit has a cross travel

of 9 inches, longitudinal travel of 20 inches, and vertical travel of 16 inches and is provided with a working surface of  $9\frac{1}{2} \times 36$  inches.

### Jurzek Leveling Jacks

Jurzek Machine & Engineering Co.  
2303 Hilton Rd., Ferndale, Mich., has placed on the market a line of scientific

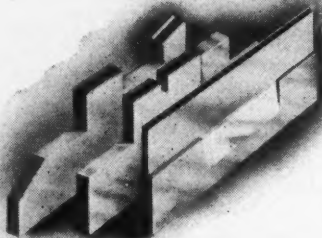


Jurzek Leveling Jack

cally designed leveling jacks for machine tools and other equipment. Where extreme accuracy of production is required from the machine units, the leveling jacks are said to provide the correct base level of the equipment.

The standard size jack, which is designated as the No. 100A, has a base of 6 x 9 inches, average height of 2 inches, and top section of 4 x 4 inches. The large base and screw of the unit are said to assure permanent accuracy. All angular faces of the jack are finish machined. Special sizes of jacks can be supplied on order.

## BLADES for Centerless Grinders



**TALIDE-TIPPED BLADES Give:**

- ★ MAXIMUM PRODUCTION !
- ★ GREATER ACCURACY !
- ★ BETTER FINISH !

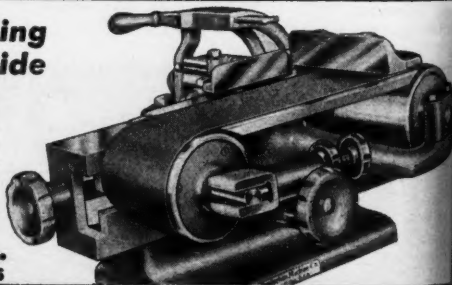
**METAL CARBIDES CORPORATION**

YOUNGSTOWN, OHIO

## Eliminate Hand Surfacing on Work up to 6" Wide

This Bench Surfer cleans and finishes castings, dies, stampings and any work that can be ground. Gives a straight line finish and leaves edges sharp. • Compact, durable, smooth running, with quick, easy adjustments. • Other Belt Surfers and Polishers, Tool and Cutter Grinders, Sensitive Drills.

**Production Machine Co.**  
GREENFIELD MASSACHUSETTS



for LESS SCRAP in your plant and  
more "*Scrap*" on the fighting front!



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TUNGSTEN CARBIDE tipped  
standard reamers by Super Tool  
are the best that money can buy  
—and the most economical from  
every point of view.

They cut faster, cleaner, truer.  
They save time and reduce scrap  
—hold their size over extremely  
long runs—give you more pro-  
duction, and speed the stuff out  
to our fighting men.

Many standard sizes in stock for  
quick delivery—in semi-finished



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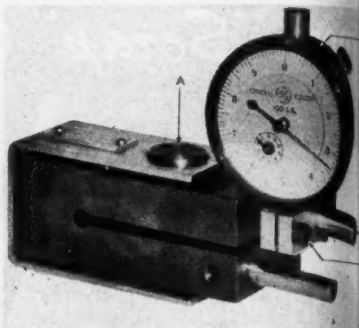


## G-E Electromagnetic Gage

An electromagnetic gage for use in measuring the strain on machine parts subject to sudden loads has been developed by the General Electric Co., Schenectady, N. Y. The gage is especially applicable as a protective device to forestall breakage of parts of punch presses, shears, press brakes, and the like where the strain during a cycle of operation occurs for a very short period of time, rising abruptly to the maximum and then falling sharply to zero.

The gage can be connected so as to

provide more than one kind of indication. A direct value of the maximum strain can be obtained from an instrument in front of the operator. A



G-E Electromagnetic Gage

or bell can be attached so as to signal when a predetermined amount of strain has been reached.

The gage need not be applied directly to the vital part of the machine under strain but can be applied to any part of the machine whose stress represents an equivalent stress on the vital part.

The G-E Electromagnetic Gage assembly includes a rod, lever arm, and housing. The rod is fastened at either end to the machine in the direction of the strain. The lever arm, which is attached at the outer end to the machine, is at right angles to the rod. The gage head is mounted on a plate which is also attached to the machine at a point on line with the lever arm. The gage consists of an armature operating within two coils.

Before a job is started, the position of the armature within the coils is adjusted so that a zero reading is registered on a connected instrument. When

## EKLIND UNIVERSAL MILLING HEAD



**SELF-CONTAINED.  
ADAPTABLE  
TO ANY  
MACHINE**

**Mills  
Drills  
Bores**

**At Any Angle**

**SPEEDS  
FROM  
250-4000**

**Write for Circular**

**UNIVERSAL HIGH-SPEED TOOL CO.**  
547 W. Washington Blvd. Chicago, Ill.

## Produce with SAFETY!

It pays to protect your operators by equipping your presses with

## STRAND SAFGUARDS

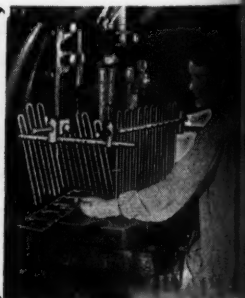
Easily installed. Adjustable to the most intricate die. Can be instantly changed for any set-up.

**Write for Bulletin today.**

**STRAND MFG. CO., INC.**

156 N. Desplaines St.

Chicago, Ill.





## WALKER MAGNETIC CHUCKS

Walker presents a complete line of Magnetic Chucks for modern equipment . . . Rectangular, Swiveling and Rotary Types in all sizes.

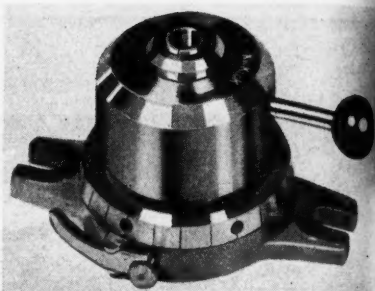
**"THE BEST WAY TO HOLD MOST WORK —  
THE ONLY WAY TO HOLD SOME WORK."**

Also belt or motor-driven DC and portable AC Demagnetizers.

**Write for Catalog W4.**

**O. S. WALKER CO., INC.**  
WORCESTER, MASS., U. S. A.

the machine is put into operation and strain is exerted, the rod pulls down on the lever arm which, in turn, pulls down on a pin in the armature and moves the armature to a new position within the coils. This affects the electromagnetic relationship between the armature and coils in accordance with the amount of strain exerted. The instrument, which has been previously calibrated against known strain loads, then indicates to the machine operator the extent of the unknown strain.



KwiKloK Collet Chuck Attachment with Indexing Base

### KwiKloK Collet Chuck Attachment

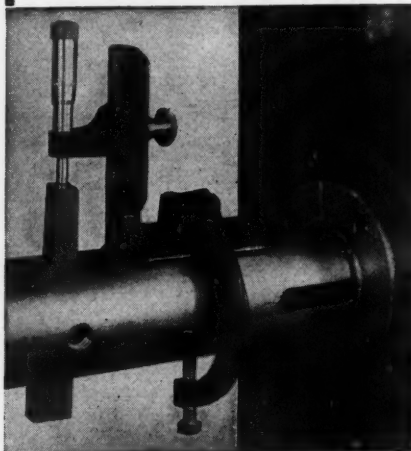
Designated as the KwiKloK, a collet chuck attachment designed to fit any lathe with a  $1\frac{1}{2}$ -inch diameter 8-thread spindle is now being marketed by D. D. Swauger, 1321 W. 47th St., Los Angeles, Cal. In use, a bracket mounted on the frame of the machine accommodates a  $\frac{3}{8}$ -inch dog fastened in the body of the attachment, thus preventing the body from turning when the spindle of the lathe is operated. The only moving part of the attachment is the small nose.

To operate, the handle of the attach-

ment is drawn toward the operator to close the collet and away from the operator to release the collet, a movement of 2 or 3 inches of the handle being required to operate the unit, depending upon the tightness of collet desired. Operation of the attachment is performed without stopping the lathe.

The KwiKloK Collet Chuck Attachment is designed for use with push-pull type collets which are split at the back thus permitting gripping over the entire inner contact surface of the collets.

## FOR SPEEDY, ACCURATE SETTING OF BORING TOOLS



### SPEED and ACCURACY essentials in WAR PRODUCTION SHOPS

Clamp the Tool Setting Gauge to the boring bar. Use the slide to bring micrometer to top of cutter. Back off micrometer to number of thousandths required to bore to size, adjust cutter to micrometer and fasten it, remove gauge and go to work.

The gauge may be had with either a micrometer or dial indicator.

**BARTELT ENGINEERING COMPANY**  
1214 PARTRIDGE AVENUE  
BELOIT, WISCONSIN

# SENSAUMATIC DRILL HEAD

PATENT APPLIED FOR

These drill heads may be used for drilling or reaming. Bottom or step drilled holes can be held within .002 of depth required. No change in machine is necessary for drilling from wood to heat treated steel.

*The Only Drill  
with a  
Metered Feed*



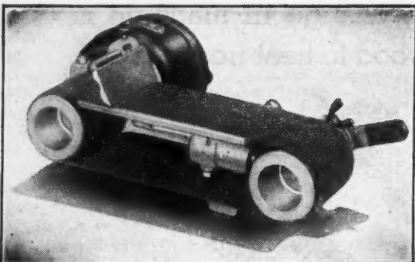
**CAPACITY  
FROM  
NO. 68 DRILL  
TO  $\frac{3}{8}$ " IN STEEL**

## MICHIGAN INDUSTRIAL SALES CO.

132 DUFFIELD, DETROIT, MICHIGAN

The attachment can be furnished with standard set of 10 collets from  $\frac{1}{8}$  to  $\frac{3}{4}$  inch round. Square or hexagon collets can also be obtained on order.

The KwiKloK Collet Chuck Attachment is also available with base for holding stock on milling machines for milling, slotting, and so on. The base is indexed in multiples of 24, and is provided with thumb lever release on indexing pin and handle for rotating. The KwiKloK Collet Chuck Attachment with indexing base can also be used on drill presses for drilling, tapping, and so on, and on dividing heads and polishing lathes.



## NEW ABRASIVE BAND GRINDER...

"Built Like a Machine Tool"

The Hormel-M Grinder is sturdily built with a supporting leg under the grinding table to eliminate vibration and tipping due to pressure on the belt. Ball bearing throughout. Equipped with ALEMITE LUBRICATION complete with grease gun.

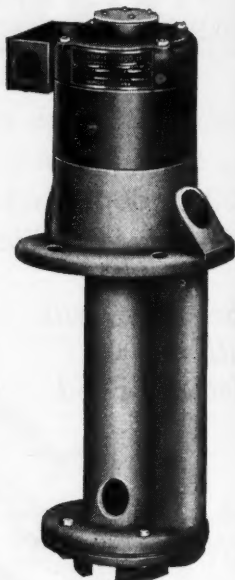
Write for illustrated folder on this and other styles and sizes.

### HORMEL-M GRINDER

WALLS SALES CORP.  
96 WARREN ST. NEW YORK, N. Y.

## Brady-Penrod Model 7500 Coolant Pump

A motor-driven, open impeller, centrifugal type, submersible coolant pump with outside discharge, designated



Brady-Penrod Model 7500 Coolant Pump

the Model 7500, has been placed on the market by Brady-Penrod, Inc., 1208 Second St., Muncie, Ind. Easily and quickly installed, the pump may be made an integral part of any grinding lathe, cutting or drilling machine or may be easily moved from job to job.



## KUTMORE ADJUSTABLE HIGH SPEED HOLLOW MILLS

16 standard sizes—Cutting capacities 1/32" to 2". Also special sizes made to order.

The KUTMORE is the only hollow mill with built-in micrometer dial adjustment. Prompt delivery—even on specials. Write for Catalog No. 15.

CARL WIRTH & SON, 1625 Clinton Ave., N.

Rochester, N. Y.

# UDYLITE



## Headquarters

### for ELECTROPLATING, POLISHING AND ANODIZING INFORMATION

For prompt, dependable metal finishing information, call on Udyllite. No organization is better equipped to give you information gained from installing plating, polishing and anodizing departments in many leading manufacturing plants throughout the country.

Trained plating engineers and electrochemists are at your service. These men know metal finishing and they can help you plan a new installation or revise your present one for greater efficiency. They know, also, that you want information quickly.

Udyllite has a complete line of equip-

ment . . . second to none in terms of quality and efficient performance.

and supplies . . . for every metal finishing need. Salts, acids, anodes, buffing and polishing materials—everything required. Call Udyllite for prompt service on your finishing requirements. You pay no more for Udyllite dependability.

**1** Laboratory where efficiency of Udyllite finishing processes is maintained by constant control. **2** Design and layout department where clients may obtain the advice of experienced metal finishing engineers. **3** Laboratory where all Udyllite products are tested under actual plant conditions.

## THE UDYLITE CORPORATION

1651 E. Grand Blvd., Detroit, Mich.

Chicago  
1943 Walnut Street

Long Island City, N. Y.  
11-16 44th Drive

Cleveland  
4408 Carnegie Ave



needed. The pump is said to deliver as high as 70 per cent hydraulic efficiency by actual test.

Additional features of the Brady-Penrod Model 7500 Coolant Pump include a plate adapter which enables the pump to fit any tank or base opening, controlled flow of any standard coolant fluid from 4 to 100 gallons per minute, and motor capacity of  $\frac{1}{8}$  to  $1\frac{1}{2}$  h.p. Suitable for use with abrasives, the pump is available in three different depths from flange—4 $\frac{1}{2}$ , 9, and 15 inches. The Model 7500 Pump can also be made in special depths.

## THE WONDER CUTTER

A Midget  
in SIZE



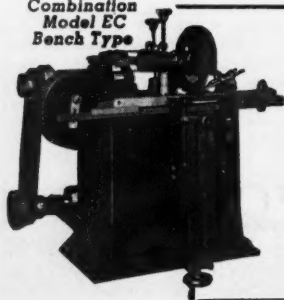
A GIANT  
for WORK



Cuts wire, rods or band iron easily and quickly. Any size wire or rod up to  $\frac{1}{2}$  inch round or  $\frac{3}{8}$  inch square and band iron up to  $\frac{1}{2}$  by 2 inches. Its small size and low price makes it possible to have more than one, mounted wherever convenient. Gauge can be set for repeated cuts of same length on both wire or band iron. Write for further information and prices.

**THE FEDERAL FOUNDRY SUPPLY CO.**  
4606 East 71st St. Cleveland, Ohio

Combination  
Model EC  
Bench Type



## SHARPEN YOUR OWN SAWS

SAVE OVER 80% ON SHARPENING  
HACK, BAND, CIRCULAR SAWS

The **WARDWELL SAV-A-SAW** automatically sharpens saws with teeth as fine as 32 to the inch at a speed up to 75 per minute. Savings on 2 gross of blades will pay for the machine. Assures keener cutting saws at extremely low cost.

Write for complete information

**THE WARDWELL MFG. CO.**

3166 FULTON RD.

CLEVELAND, OHIO

## Portman Model P220 Optical Comparator

The Portman Machine Tool Co., Beechwood Ave., Mount Vernon, N. Y. has placed on the market the Model P220 Optical Comparator.

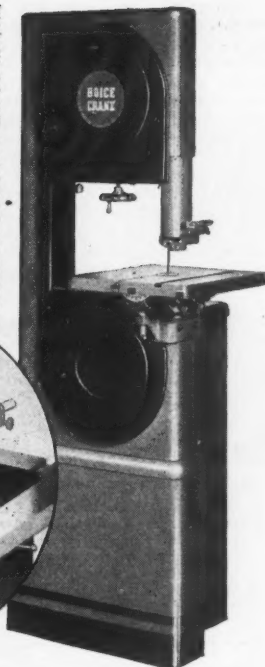
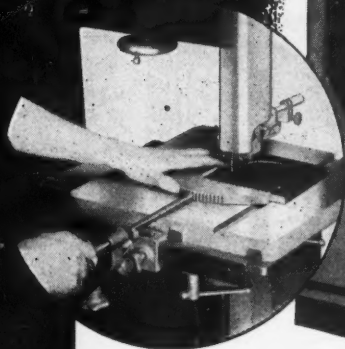


Portman Model P220 Optical Comparator

P220 optical comparator shown herewith. The feature of this unit is the 20-inch diameter image screen which enables the comparator to project an unusually large area. The fine quality lens unit furnished with the comparator projects a sharply defined outline of the part over the entire 20-inch diameter area of the screen.

# NEW LOW-COST 14" BAND SAW

FOR  
PRECISION  
CONTOUR  
SAWING



It Is Also  
An All-Purpose  
Cut-Off Machine For

IRON & STEEL  
BRASS & COPPER  
ALUMINUM & ZINC  
WOOD & PLYWOOD  
BUILDER'S BOARDS  
BRAKE LINING  
CASTING SPRUES  
ASBESTOS & RUBBER  
PIPE • FIBER  
PAPER • PLASTICS

Or Other Tough  
Industrial Materials

## SPECIFICATIONS

Throat depth—13½". Under Guide Clearance—8⅞". Blades, width—⅝" to ¾" wide; length—98". 8-Speed Gear Box Drive—92, 128, 183, 250, 1650, 2420, 3260, 4100 ft. per minute. Micrometer Set Blade Guides with New Type Jaws. Height—67"; Floor Space—27½" x 29"; Weight—365 lbs. Model shown \$214.50, F.O.B. Factory, with ½ h.p., 1 ph. motor. Blade Welder for inside cutting, \$90.

## For Toolroom or Production

The Boice-Crane is designed for use anywhere in the plant. Stands the gruelling pace of production line or foundry. Meets exacting toolroom needs.

Makes straight, angular and contour cuts. Beats milling machine and shaper time roughing out dies, cams, punches, and odd-shaped assembly parts.

Write Div. A for Literature Today!

**BOICE-CRANE CO.**  
**TOLEDO, OHIO**

Designed for use by inexperienced workmen for critical inspection and comparison, the Model P220 comparator is supplied complete with coordinate-type stage, dial indicators for taking continuous readings, surface illuminators for projecting the surface characteristics of a part, and a blower system attached to the light source assembly enclosing the condenser lens unit. The light beam is filtered through a colored heat-absorbing glass unit within the condenser lens, thus providing a soft light of great clarity over the entire screen.

The Portman Model P220 Optical Com-



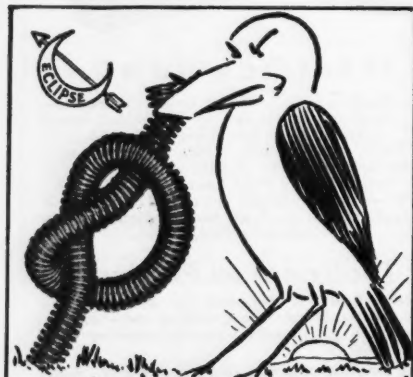
WRITE FOR FREE SAMPLE —

#### TAMMS BLUE LAYOUT DOPE

Speeds layout on all metals. Gives clean accurate detail. Won't chip, crack or flake off. Comes 8 oz. brush-in bench cans, also pts., qts., gals.

Write for FREE SAMPLE!

**TAMMS SYCA CO., 229 N. LaSalle, Chicago, Ill.**



**"It's a tough worm  
says this bird."**

"It twists and it bends, While I pull and I shake,  
And give it the works, But still it won't break."

Write for Free Bulletin No. H-201.

#### ECLIPSE AVIATION

Seamless Flexible Metal Hose

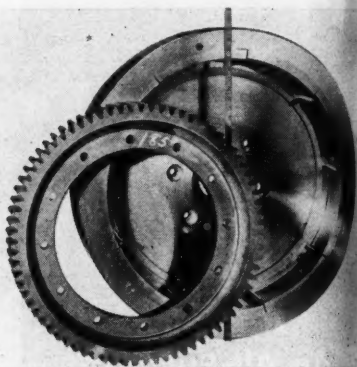
Manufactured and Sold By

**Division of Bendix Aviation Corporation  
DEPT. No. 2 PHILADELPHIA, PA.**

parator is 58 inches high x 26 inches wide x 36 inches deep, and weighs approximately 400 lb., and is available with lens units of the following magnifications: 10X, 20X, 30X, 31½X, 45X, 50X, 60X, 62½X, 80X, and 100X. The light source of the device is designed for operation on 110-220 volts alternating or direct current.

#### Cotta Speed-Chuck

Charles Cotta, 1712 Harlem Ave. Rockford, Ill., is now offering the Cotta Speed-Chuck illustrated herewith for



Cotta Speed-Chuck

use in holding spur or helical gears for hub, hole, or face grinding and other comparable operations. In loading, gears are simply set into the chuck where a slight turn causes them to be gripped firmly by a set of hardened and ground pitch-line pins. These pins bear against a set of accurately ground

#### SAVE MONEY! BUY PEN-OX-SOL

REMOVE RUST — TARNISH — OXIDATION QUICKLY AND SAFELY WITH \*PEN-OX-SOL. \$1.70 FOR LIQUID CONCENTRATE TO MAKE A GALLON. MERELY ADD WATER! SAVE MONEY!

**GUARANTEED EQUAL TO ANY AT ANY PRICE OR MONEY BACK.**

Free delivery to industrial plants only East of Miss. 33¢ extra to all points West.

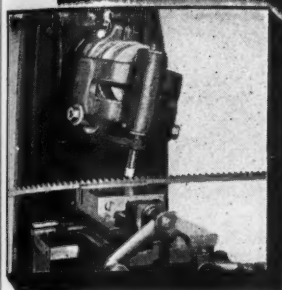
\*PEN-OX-SOL... FAST PENETRATING OXIDE SOLVENT is free from Muratic, Sulfuric, Nitric, Oxalic Acid or Cyanide...

Non-Inflammable... Harmless to normal skin... For surface or immersion cleaning... Equipment cleaned with PEN-OX-SOL will not contaminate food products. Full instructions.

Send check or M.O. ... C.O.D. 12 cents extra.

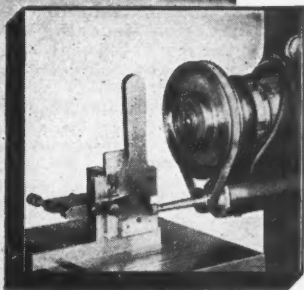
**U. S. DETERGENTS CO., 338 CANAL ST., N. Y., N. Y.**

# LIBERTY High Speed Grinding Attachments



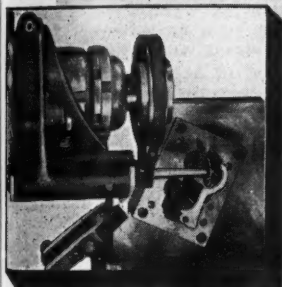
*Grinding clearance of broach teeth.*

Both horizontal and vertical types are easily attached to most surface grinders for grinding angles, slots, recesses and surfaces which are impossible to reach with large grinding wheels.



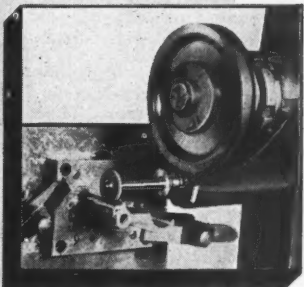
*Grinding gage in perfect alignment with other points.*

For extremely accurate grinding on gages, tools, dies, etc. Assembled complete with any size bores, pulleys, belts and grinding wheels at no extra cost.



*Grinding punch form.*

Write for details — specifying diameter of spindle head, type and make of grinder.



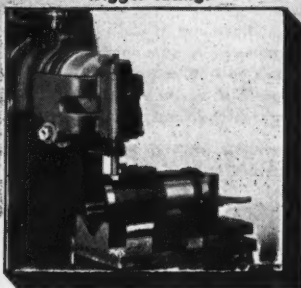
*Grinding shoulder on punch.*

## LIBERTY TOOL & GAGE WORKS

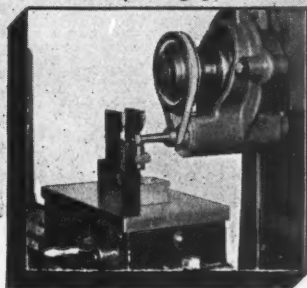
235 Georgia Ave.

Providence, R. I.

*Grinding rectangular opening in trigger casing.*

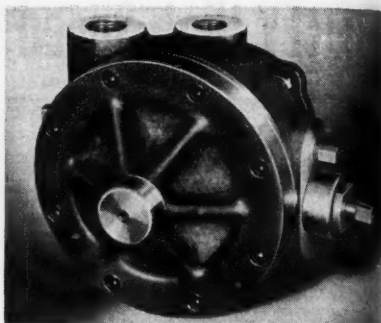


*Grinding gaging seat on special gage.*



centric cams which are placed in such a manner as to tighten against the normal direction of rotation. Gears are released by a slight turn of the chuck in the opposite direction.

With the Cotta Speed-Chuck, alignment of gears is said to be automatically accurate, since the pins of the chuck are sized to bear at the pitch line of gears and the cams of the unit are carefully ground to assure concentricity. The Cotta Speed-Chuck is available in various types for single or cluster gears and in sizes from 3 to 36 inches in diameter.



Hydro-Motive Redesigned Variable Delivery Vane-Type Pump

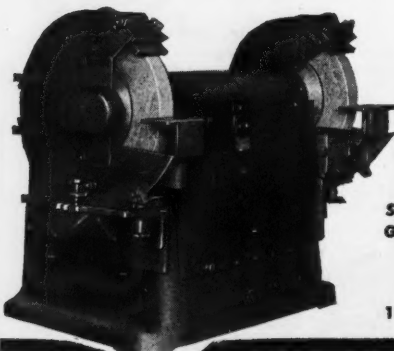
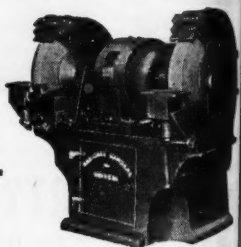
### Hydro-Motive Redesigned Variable Delivery Vane-Type Pump

Heavier section reinforcing webs, conical instead of flat cover plate for increased resistance to shock, and mounting bracket of a type considered standard by most manufacturers of hydraulic pumps are features of a redesigned variable delivery vane-type pump announced by Hydra-Motive, Inc., 253 St. Aubin Ave., Detroit, Mich. Originally designed and previously manufactured exclusively for use with the Duplimatic,

an automatic precision type machine tool control which requires high pressure delivery at extremely low volume, the Hydra-Motive Vane-Type Pump is now available as a replacement for existing pumps or as new equipment.

The adoption of a "standard" mounting brackets permits the pump to be used as a replacement or as original equipment without changing current designs. An additional feature of the

## Another Reason Why **MARSCHKE** MAKE YOU MONEY



THE BIG EXPENSE in grinder operation is wheel wear. MARSCHKE A. C. and D. C. Multiple Speed Grinders lengthen wheel life by maintaining correct S.F.P.M. Adjustment of work rest as wheel wears not only automatically sets spark shield close to wheel but speeds up D. C. motor, or signals the proper time to change A. C. speed. This is just one of 18 important features that makes MARSCHKE the best buy.

Send for catalog on the quality MARSCHKE Line of Grinders and Buffers—1 to 25 H.P.; 10" to 30" wheels.

**VONNEGUT MOULDER CORP.**

1804 MADISON AVE.

INDIANAPOLIS, IND.

TO MACHINISTS USING McCROSKEY SUPER REAMERS\*

# Know Your Weapon

AS WELL AS

# He Knows His



WHATEVER his combat branch, the American soldier, sailor or marine knows his weapon from A to Z.

IF a McCroskey Super Reamer is one of your weapons in this war, you'll be helping your plant's production and Uncle Sam by knowing that weapon from drive slot to cutting edge, by knowing how to keep that weapon in "fighting trim."

There's a free new McCroskey Reamer Manual to help you be an expert with that weapon. In short, simple language, this illustrated booklet covers the basic principles of the inserted-blade reamer, the fundamentals of reamer grinding and maintenance. It will help you do top work and at the same time insure the maximum efficiency and long life of the tool.

WRITE NOW FOR



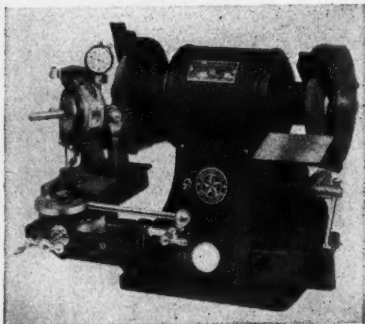
McCROSKEY REAMER MANUAL





## PERFECT POINTS ON STANDARD DRILLS

SIZES No. 41 to 5/8"



Trim your drill costs with a STAR Precision Drill Grinder. Write for Folder.

**Star Machine & Engineering Corp.**

Division Star Electric Motor Co.,  
BLOOMFIELD, N. J.

**GRANT**

**RIVETERS**



• Pioneers in the riveting field. Head rivets from smallest to 1/2" diameter, either by noiseless spinning or vibrating hammer method.—Sizes to meet all needs.—Types include Vertical and Horizontal Multiple Spindles.

Write for literature—and don't forget to send samples.

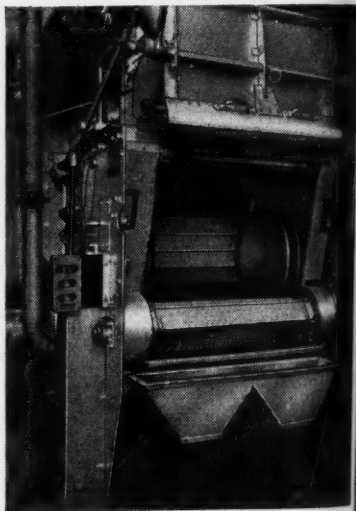
**THE GRANT MFG. & MACHINE CO.**  
96 Silliman Ave. Bridgeport, Conn.

pump is the unique method of balancing the individual vanes. The vanes are beveled on two edges as well as on the outer (stator) side, the result being a marked reduction in wear, elimination of overheating, and increase in operating efficiency.

Delivery of the Hydro-Motive Redesign Vane-Type Pump is infinitely variable from 0 to 4 gallons per minute by means of screws located on the outside of the housing. Operating pressures range from 1,000 lb. per square inch to a "short-interval maximum" of 3,500 lb. per square inch.

## Wheelabrator Double Hopper Trough Feed

A double hopper trough feed which can be used in connection with a Wheelabrator Tumblast has been placed on



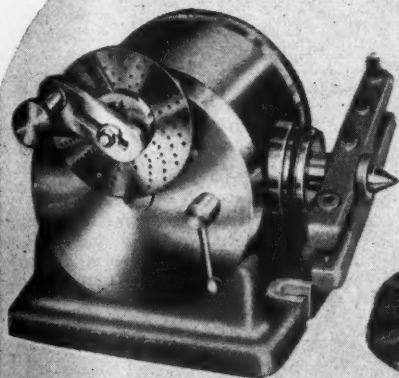
Wheelabrator Double Hopper Trough Feed

the market by the American Foundry Equipment Co., Mishawaka, Ind. The double hopper trough feed is said to prevent spillage of small workpieces in moving the work from the tumbling unit after the parts have been cleaned.

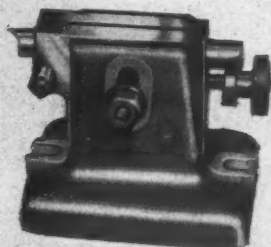
After the workpieces have been cleaned, they are unloaded directly

# L-W DIVIDING HEADS

Astonishingly low priced, but high in quality, these new L-W 11" Universal Dividing heads give the utmost in accuracy at a cost lower than any similar piece of equipment on the market. Ruggedly built, constructed with many new features which increase their accuracy and their use for practical, profitable shop operation.



Model BP



**HEADSTOCK** — New, ruggedly designed for maximum rigidity. Can be swiveled to an angle.

**TAILSTOCK** — New design, heavier and stronger.

**HEADSTOCK SPINDLE** — Tapered bearings, bored for No. 10 B. & S. taper. Increased diameter and length. Threaded nose  $2\frac{1}{4}$ " diameter 10 thread USS.

**WORM** — Made from special alloy steel, accurately finished, end thrust taken by ball bearings. Means are provided to make adjustment of worm wheel easily and accurately.

**WORM WHEEL** — Large diameter, 40:1 ratio, accurately generated, securely mounted on spindle.

**EQUIPMENT** —  $\frac{3}{8}$ " table slot tongues, three index plates are furnished, dividing all numbers to 50, and even numbers to 100, with the exception of 96 T. The Index chart furnished gives all divisions obtainable to 380.

**MODEL BP FOR PLAIN MILLING MACHINE**

**\$128.55**

**MODEL AU—FULL UNIVERSAL FOR COMPLETE INDEXING AND SPIRAL CUTTING**

**\$194.65**

## L-W CHUCK CO.

20 N. ST. CLAIR ST.

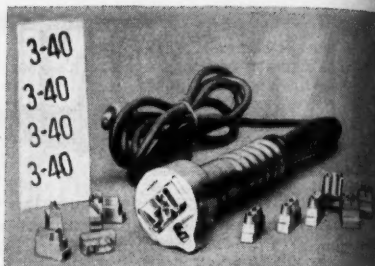
TOLEDO, OHIO

the airless abrasive blast cleaning machine into shipping barrels. The double hopper trough feed into which the cleaned parts pass is said to eliminate extra handling brought about through the hauling of cleaned material to the shipping department in containers and later transferring the parts into shipping barrels.

In cases where parts being cleaned require further processing after the blasting step, the trough does not interfere with their discharge from the Wheelabrator Tumbler to any other kind of suitable tote boxes for conveyance to other departments in the plant.

### Acromark No. 40 Electric Hand Brander

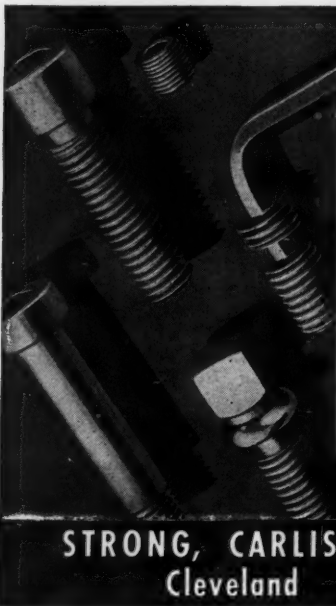
The illustration shows the Acromark No. 40 Electric Hand Brander for marking rubber, plastic, wood, fiber, and fabric products which has been introduced by The Acromark Corp., 9 Morrell St., Elizabeth, N. J. Available in several sizes to suit various marking requirements, the tool is designed for easy plugging into an electric light socket and can be readily operated by any un-



Acromark No. 40 Electric Hand Brander

skilled workmen. Letters or figures can be interchanged in the holder and interchangeable dies can be substituted for branding names, trade marks, and Government emblems.

Commonly used for branding tires, acid carboys, packing cases, wet belts, packing and plastic materials, the Acromark No. 40 Hand Brander incorporates an ample size heat unit which is protected by a twisted metal guard. The heating element extends into the die holder a sufficient distance so as to provide proper heat to the marking head for good branding results.



## PRECISION + STRENGTH

Today's demands for precision and strength only emphasize the fact that Mac-its always have been made as accurate and strong as possible.

The Mac-it process plus perpetual testing and skilled heat treatment produces screws that meet the strict specifications of Victory tools and weapons.

Whenever your production calls for utmost **Precision** and **Strength** in holding-together or holding-down jobs . . .

**SPECIFY MAC-ITS**

**STRONG, CARLISLE & HAMMOND COMPANY**  
Cleveland

**Ohio**

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*Savings*  
**IN TURRET  
LATHE TIME**  
while  
**ROUGHING OUT  
GEAR BLANKS**

# CINCINNATI ACME UNIVERSAL TURRET LATHES

• This is one of five recently installed CINCINNATI ACME Universal Turret Lathes at the CINCINNATI GEAR COMPANY used for the production of all types of gears from various kinds of steels.

We show one of these turret lathes roughing out bevel gears and the "Gear Company" reports that the turret lathe time on one job was reduced from 18 to 10 minutes per piece

and comparable savings are being made on all the new Acme Turret Lathes.

Cuts as deep as  $\frac{5}{8}$ " with .027 feed running at a cutting speed of 275 S. F. P. M. with cemented carbide cutting tools are made possible by the power, speed and rigidity built into this modern turret lathe.

**Speed up Production for Victory.**

**ACME**

MACHINE TOOL CO.,  
...CINCINNATI, OHIO

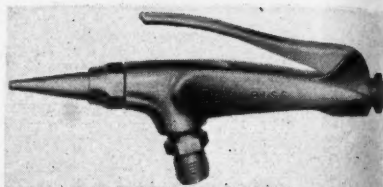
The type and dies are available made of a brass or bronze alloy or steel, depending upon the purposes for which the tool is to be used. To change the type or dies, a screw in the holder is loosened which permits the type to fall out. Special branding heads for design or name branding are also available.

### DeVilbiss Type SGF Flow Gun

Designated as the Type SGF, a flow gun designed for caulking, cementing, and other flow operations where plastic materials such as crack fillers, sealing compounds, and heavy paints are used is announced by The DeVilbiss Co., 300 Phillips Ave., Toledo, Ohio. The gun is said to be particularly useful in doping and cementing fabric parts of aircraft and for a wide variety of similar jobs.

Principal features claimed for the Type SGF flow gun are minimum restriction to flow of material and ease of handling due to the small, lightweight, well balanced design of the unit.

Material is fed to the gun under pressure and is extruded into cracks, grooves, and over seams which are to be sealed. The volume of flow can be



DeVilbiss Type SGF Flow Gun

controlled either by regulation of the pressure or by a simple knurled nut adjustment of the fluid needle. Nozzles for all materials are available.

### "Senacon" Air Motor

Designated as the "Senacon," an air motor complete with universal integral valve for use wherever powerful reciprocating motion is required is now being marketed by the Smith-Johnson Corp., 623 E. 12th St., Los Angeles, Cal. The motor can be used as a piece of auxiliary equipment on machine tools for use in opening and closing vises and holding fixtures, operating clutches and



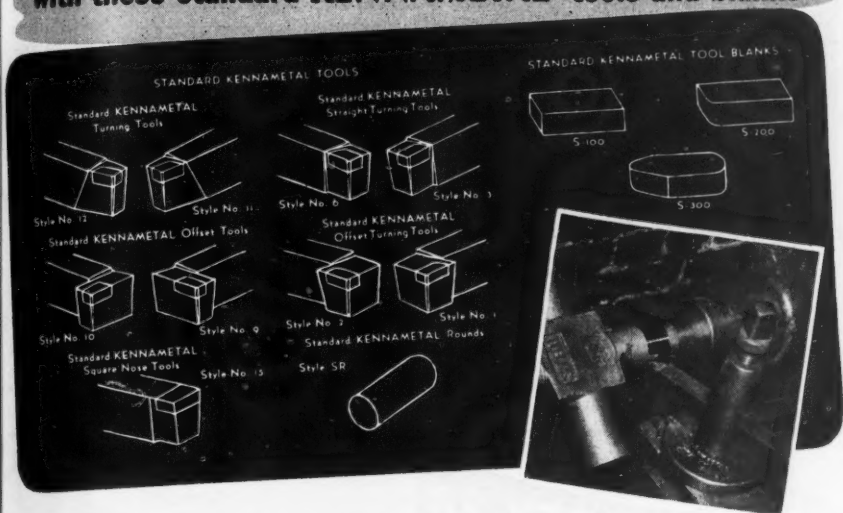
*Rawhide*



... and the hide of the Java Water Buffalo such as is used in Chicago Rawhide Hammers and Mallets is the toughest and the most enduring of all. These fine tools in sizes from 2 ounces to 6 pounds are not only long-lasting but are made to strike thousands of blows accurately and safely without damaging surfaces or materials from delicate wire insulation to heavy duty yet precision made crankshafts. At your dealers.

**CHICAGO *Rawhide* MFG. CO.**  
1281 ELSTON AVE. ★ CHICAGO, ILLINOIS.

**9 out of 10 steel-cutting jobs**  
**CAN BE HANDLED QUICKLY and CHEAPLY**  
 with these standard **KENNAMETAL\*** tools and blanks



The illustration shows ten standard styles of KENNAMETAL tools. They will be found suitable for the majority of turning, boring, and facing operations on steels hardened up to 550 Brinell. Save time by using these standard tools, or by ordering KENNAMETAL blanks and brazing your own tools.

All KENNAMETAL tools are more economical and more efficient than ordinary ones. Their great hardness, wear resistance and crater-resistance makes them outlast other tools, and do more work in any given time.

Visit the KENNAMETAL Booth C-110 at the  
 National Metal Congress

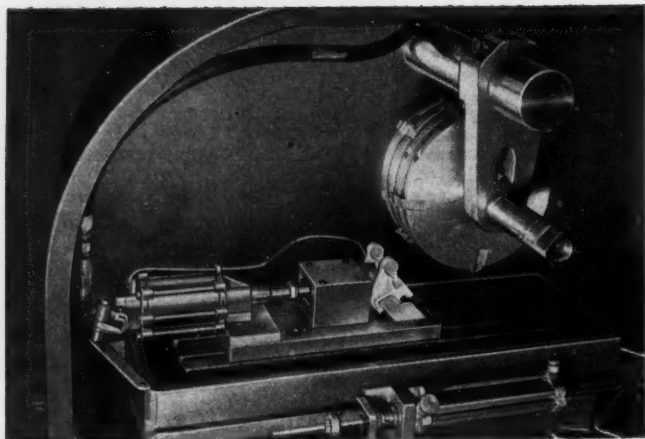
\* INVENTED AND MANUFACTURED IN U. S. A.

Get the facts about  
 KENNAMETAL! Write  
 for a copy of the Vest  
 Pocket Manual con-  
 taining full details.



**McKENNA METALS Co.**  
 300 LLOYD AVENUE, LATROBE, PENNA.  
 Foreign Sales: U. S. STEEL EXPORT CO., 300 Church St., New York  
 (Exclusive of Canada and Great Britain)





"Senacon" Air Motor applied to milling machine for use in operating work-holding fixture

uniformity of power application.

Another important function of the Senacon Air Motor is as a prime mover for supplying fractional horsepower for such operations as tube flaring, punching, broaching, stamping, die casting, and bushing insertion. Outstanding features of the motor include dual exhaust

ports which provide for selective utilization of exhaust air blasts for ejecting workpieces, cleaning out chips, and adjusting speed of one or both strokes.

The Senacon Air Motor is available in standard models with strokes of 1 1/2, 2 1/2, 6, and 9 inches. Sizes from 1 to 18 inches can be furnished on special order.

# The MOREY 2G

Back-Geared

## TURRET LATHE

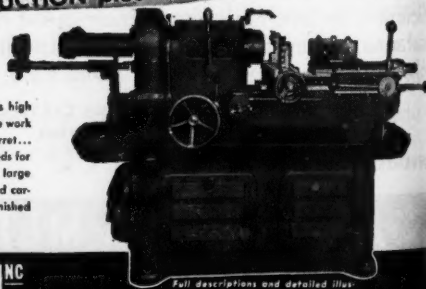
Timken Bearing

Self-Locking Turret - Infinite Spindle Speeds

**CAPACITY**  
Automatic Chuck (round) 1"  
Swing over cross slide 6"  
Swing over bed 14"

Features HIGH SPEED PRODUCTION plus OPERATING ECONOMY

The MOREY 2G Timken Bearing Turret Lathe insures today's high speed production with a minimum of operating expense. More work at less cost with these money saving features: Self-Locking Turret... Vibrationless precision with an infinite variety of spindle speeds for every job... Back Gears instantly thrown in through extra large Twin Disc Clutch... takes full advantage of high speed and carbide tools. Modern design for modern production. Can be furnished with tooling.



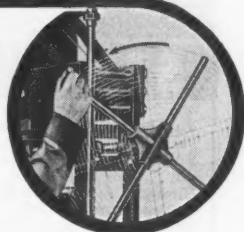
**MOREY MACHINERY CO., INC**  
418 BROOME STREET • NEW YORK, N. Y.

Full descriptions and detailed illustrations are shown in Circular 629. Ask for it TODAY!

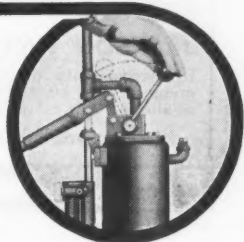
# Here's how **SPEED** is built into HYDRAULIC ARBOR PRESSES



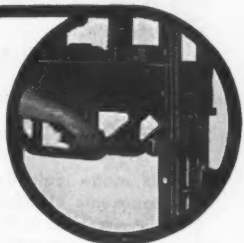
**1 SPIN THE HAND-WHEEL** and the ram speeds to the work by fast mechanical action instead of slow, laborious hydraulic pumping.



**2 FLIP THE BALL ARM** to close the valve instead of slowly turning a hand-wheel type control.



**3 START PUMPING** and immediately get tons of pressure on the work because the hydraulic cylinder was automatically filled with oil during operation No. 1.



• The new KRW Presses are designed for **SPEED...speed** in bringing ram to the work...**speed** in developing hydraulic pressure...**speed** in raising ram to remove the work. The "capstan" type handwheel raises the ram with the same mechanical speed employed in lowering it.

A Two Speed Pump, controlled by a

quick, half turn of a finger lever, enables operator to select the speed best suited to the job—the double plunger action is  $2\frac{1}{2}$  times faster than the single action. Write for bulletin describing 25, 50 and 75 ton presses—priced from \$198.00\*.

\*Prices F. O. B. Arcade, N. Y. Slightly higher west of Rockies

## K. R. WILSON

MAIN OFFICE: LOCK ST., BUFFALO, N. Y., U. S. A.

PORT OFFICE: 90 WEST ST., NEW YORK, N. Y., U. S. A.

EAST COAST: Osborne Mach. Co., San Francisco, Calif., U. S. A.  
Smith-Booth-Usher Co., Los Angeles, Calif., U. S. A.

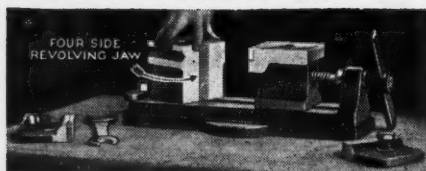
### Mail This Coupon

K. R. Wilson, 37 Lock St., Buffalo, N. Y.  
Please send Hydraulic Arbor Press Bulletin  
No. 37.

Name

Address

City  State



## SAVES LABOR

You will eliminate many costly hours from your Payroll by using the JACKSON TIME-SAVING VISE. It saves the time wasted by your Machinists in hunting for Bolts, Clamps, Angle Plates, etc., when rigging up work on the Drill Press, Miller, etc. Of still greater importance is the saving in output you effect by not having your productive machine standing idle during the rigging up process, for the—

### JACKSON TIME-SAVING VISE

by means of its revolving jaw and supplementary jaws instantly holds the thousands of shapes that arise in machine work.

SEND FOR BULLETIN No. 23-M.

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ENGINEERING CO READING, PA.

## Gear Specialties

**SPURS — HELICALS** (14 to 96 D.P.)

**BEVELS** — (straight and spiral)

**WORM GEARING — THREAD GRINDING**

This range logically embraces the gear components of many critical control devices essential to the war effort and this organization is proud of its contributions of such material in the program.

With full production capacity scheduled far into the future, all new inquiries are now necessarily subordinated to these vitally important prior commitments. However, every urgent need will be given careful consideration.

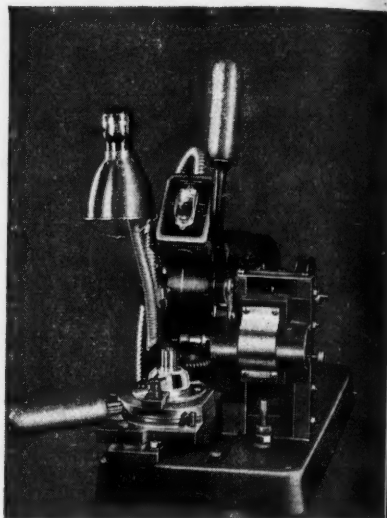
## Gear Specialties

MANUFACTURERS  
CHICAGO

## Rouse Hand Miller

Illustrated herewith is a hand milling machine for use in milling small parts which has been placed on the market by H. B. Rouse & Co., 2214 N. Wayne Ave. Chicago, Ill. The machine is a high speed, ball bearing, motor-driven, bench unit suitable for performing light cutting operations on brass, aluminum, and similar materials.

The Rouse Hand Miller is adaptable



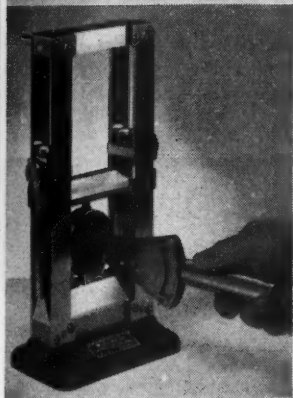
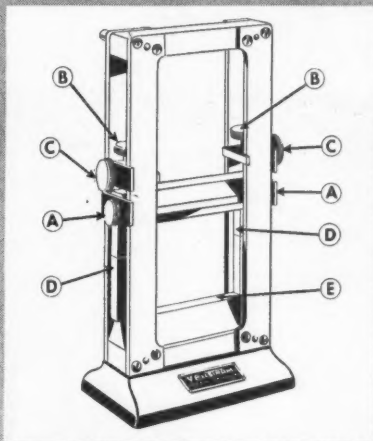
Rouse Hand Miller

for use with either small circular milling cutters or small end mills and can be used in milling small parts for radios, electric motors, airplanes, and similar equipment.

## Wagner Templet Duplicator

A templet duplicating machine similar in general construction to a proof press used in printing has been brought out by the Charles Wagner Litho. Machinery Co., 51 Park Ave., Hoboken, N. J. The machine is designed to accommodate a scribed sheet metal master templet, such as used in aircraft manufacture, and to print an impression of it on a duplicate sheet. The duplicate impression is black with all scribed lines appearing in white. Any number of duplicates can be made.

**Increase your  
efficiency in  
setting your  
Internal  
Indicators**



Above is a photograph of the Ellstrom Gage with the indicator being set at 3". To insure the ultimate in accuracy, each Ellstrom Gage is constructed of the finest steel with gaging surfaces that are processed and finished to millionths in flatness. For prices and delivery information wire or write today.

**T**HE diagram drawing above shows the Ellstrom Gage set at 3" and the key explanation below gives the adjusting procedure.

Screws A on upper parallel bar have been carefully adjusted and need not be touched. In raising or lowering the bar loosen only screws C, then place fingers on screws A, and move bar upward or downward as the case may be, but without turning the screws.

Allow room to place the gage blocks on lower parallel between the posts of the gage. Then lower bar until its surfaces and those of the blocks fit snugly without any forcing. Tighten screw C lightly and evenly. Screws B are then used to apply slight pressure in making final adjustment.

D gage blocks    E stationary parallel

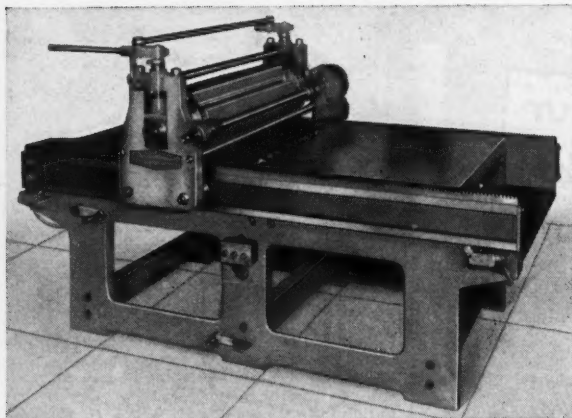
**Originators of Chromium Plated Gage Blocks**

**DEARBORN GAGE COMPANY**

**22032 BEECH STREET  
DEARBORN, MICHIGAN**

October, 1942

MODERN MACHINE SHOP 291



Wagner Templet Duplicator

In operation, the master templet is fastened in position on the bed at the right of the machine and then coated with ink by a hand roller. Next, a push button is pressed, thus causing a motor-driven printing-roll assembly to advance and take an impression from the master which is deposited on a duplicate sheet held on the bed at the left of the

machine. This transfer operation is accomplished by means of a rubber blanket attached to the printing roll.

The master bed can be adjusted to accommodate sheets up to  $\frac{1}{4}$  inch thick. The duplicate bed is designed to handle sheets of any thickness up to 1 inch. The bed size is 48 x 84 inches, larger templets being printed in two operations. A hand crank is provided for operating the machine in the event of power failure.

### Giles Automatic Staking Machine

The Giles Automatic Staking Machine illustrated herewith, product of the Weber Machine Corp., Rochester, N. Y.

## CERRO ALLOYS for Prompt Shipment

**CERROMATRIX** (Melting Temp., 250° F.) For securing punch and die parts, anchoring machine parts without expensive drive fits, for engraving machine models, stripper plates, chucks, short run forming dies and other metal working applications.

**CERROBEND** (Melting Temp., 158° F.) Used as a filler in bending thin-walled tubing to small radii. Easily removed in boiling water. Also used for aircraft assembly jigs, templates for forming dies and other purposes.

These two low-temperature-melting and expanding alloys are helping to speed up production of war materials for the Army, Navy and Air Force.

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Brooklyn, N. Y., Belmont Smelting and Refining Works  
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40 WALL STREET - - - - - NEW YORK, N. Y.

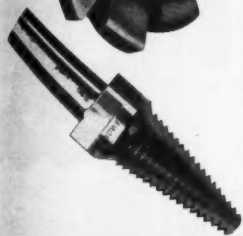
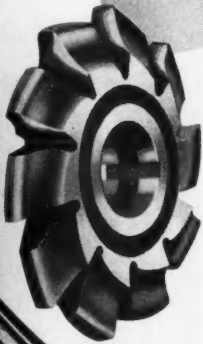
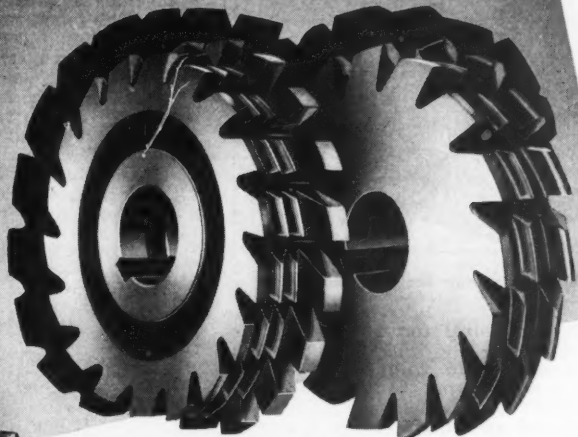


MIDWEST

## FORM RELIEVED CUTTERS

are economical when you have to mill intricate shapes and outlines

MIDWEST



### WHEN CONSIDERING FORM CUTTERS, NOTE THE FOLLOWING:

There are an infinite number of shapes, both symmetrical and irregular in outline, which can be milled efficiently and economically with Midwest Form Relieved Cutters. These cutters, provided with eccentric relief behind the cutting edges, always maintain the original outline of form when they are sharpened by grinding the faces of the teeth. However, conditions are so varied in the application of form cutters, no definite rules can be offered for making a proper selection as to type and form. When considering form cutters, send a blueprint of part to be milled; outline the cutter on the surface to be milled; furnish all dimensions of the form shown, with tolerances; specify arbor diameter, keyway size, and rotation. On unsymmetrical forms, designate below the outline, rotation, as "bottom going" or "bottom coming." Whenever possible, form cutters should have undercut teeth, the degree depending upon operating conditions. When sharpening a form cutter, the amount of undercut which is marked on the cutter should be preserved, since the form was corrected for this exact amount of rake . . . Other examples of Midwest Form Relieved Cutters may be found in Midwest's catalog 17 of Precision Metal Cutting Tools.

*Your Security and Freedom depend on your Country Winning the War. There is no alternative. Your Country needs your Fighting Dollars for Victory. Invest them Now in United States Bonds and Stamps.*

END MILLS • SLEEVES • COUNTERBORES • SPECIAL TOOLS • DRILLS  
REAMERS • FORM TOOLS • CARBIDE TIPPED TOOLS • ADJUSTABLE HOLDERS

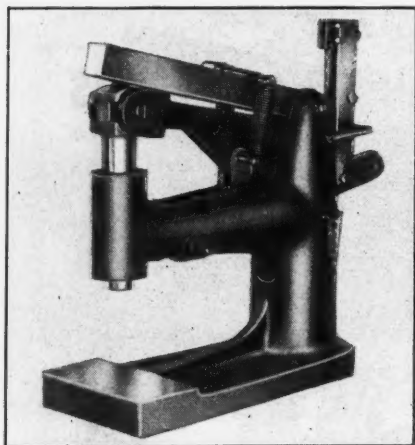
# MIDWEST

*Precision*

METAL CUTTING TOOLS

MIDWEST TOOL & MFG. CO. • 2362 W. JEFFERSON AVE. • DETROIT, MICHIGAN





Giles Automatic Staking Machine

is said to be ideal for use in riveting movable joints. The work is firmly held by a pressure pad while being struck by the hammer of the machine, the force of the hammer blow being always uniform and adjustable to suit the par-

ticular job at hand. According to the manufacturer, the machine is arranged so that it is impossible to trip the hammer with fingers in die of the unit.

The Giles Automatic Staking Machine is also said to be particularly applicable for such work as pointing with platinum, tungsten, or silver, burring and assembling clockwork mechanisms, eyeletting and inserting grommets, and so on. The machine is available in three models designated as the No. 1, No. 1-1/2 and No. 2 with stroke of 2, 2, and 2 1/2 inches respectively.

Additional specifications of the three models in respective order are as follows: maximum distance die space, 2 1/4, 3 1/4, and 4 inches; hole in spindle, 1, 1 1/4, and 1 1/2 inches; size of plunger pad, 1/2, 5/8, and 3/4 inch; size of table, 1 1/2 x 3/4, 3 x 6, and 3 x 6 inches; depth of throat, 4 1/4, 4 3/4, and 8 1/2 inches; bench or floor space required, 9 x 12, 9 x 12, and 9 x 12 inches; approximate net weight, 30, 40, and 75 pounds.

## Alloy-Sprayer

A self-contained, portable metal atomizer capable of spraying any neutral alloy which has a melting temperature

## ASSEMBLIES MADE IN SECONDS

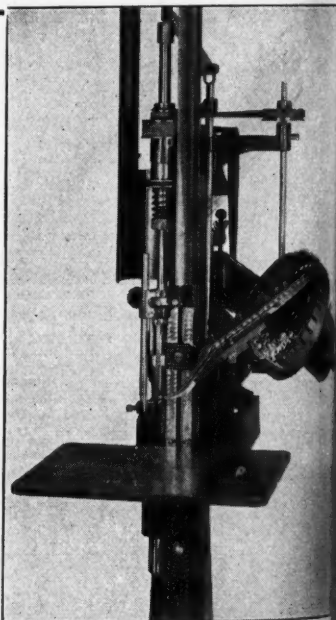
OLD METHODS TAKE MINUTES.

Use POWER SCREWDRIVERS  
and  
CUT YOUR COSTS.

THREE MODELS.

Send Samples for Production  
Estimates and Prices.

**DETROIT POWER SCREWDRIVER CO.**  
2807 WEST FORT STREET DETROIT, MICHIGAN



## S. & A. 6-TOOL TAILSTOCK TURRET

Converts Engine or Bench Lathe  
to Screw Machine—QUICKLY

**SPEED UP PRODUCTION  
REDUCE COSTS**



Simply lift control pin, turn lever and tool is ready for next operation. Turret is  $4\frac{5}{8}$ " in diameter and has six bored holes held to very close tolerances.

Arbors furnished with turret are either No. 2 or 3 Morse Taper.  $\frac{1}{2}$ " or  $\frac{5}{8}$ " bore holes.

**\$31.25**

F.O.B.  
Newark, N. J.

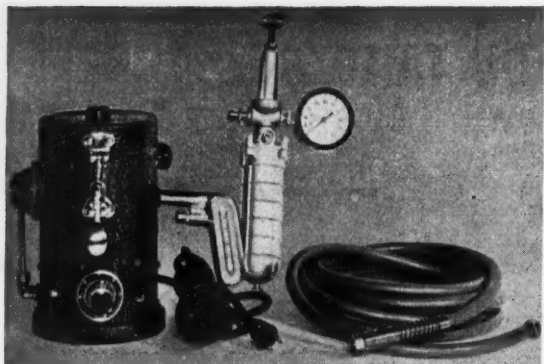
**Write  
for Folder**

# SCHULTZ & ANDERSON CO.

MACHINE TOOLS

109 EDISON PLACE

NEWARK, N. J.



### Alloy-Sprayer

eration requires a high speed of depositing metal for "backing-up" purposes.

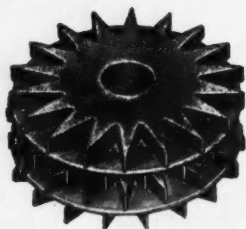
Simple in design and thoroughly fool-proof in operation, the Alloy-Sprayer requires only connection with electric power and factory air pressure line for operation. No special protection is required for the operator doing spraying other than adequate ventilation. Due to the peculiarity of the atomized metal deposited by the sprayer, the operator

doing the spraying can, it is claimed, hold lightweight work in his bare hands without any danger of being burned.

The Alloy-Sprayer illustrated is a 12 cubic inch capacity model and is equipped with electrical elements for heating the metal in a heavily insulated pot. Temperature control is variable to suit individual alloys over a range of 100 deg. by means of a rheostat switch knob on the outside of the pot. A thermostat holds the metal at any pre-

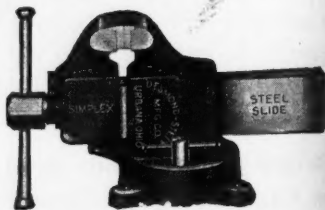
of up to 600 deg. F. for protective coating, reproducing likenesses, and so on, is now being offered by the Alloy-Sprayer Co., 2040 Book Bldg., Detroit, Mich. Designated as the Alloy-Sprayer, the atomizer is recommended for use in making templets, spotting or checking dies, reproducing molds, and so on. The sprayer is said to be especially suitable where accuracy of reproduction is so fine that even pin scratches must be faithfully reproduced and where the same op-

## DESMOND GRINDING WHEEL DRESSERS and CUTTERS



We can supply you with the proper Dresser and Cutter for all of your grinding wheels. Ask for copy of our catalog and name of your nearest dealer.

## SIMPLEX Steel Slide VISES



A full line of Machinists', Filers, Welders, Production and Drill Press and Milling Machine Vises. Let us send you our vise catalog and name of your nearest dealer.

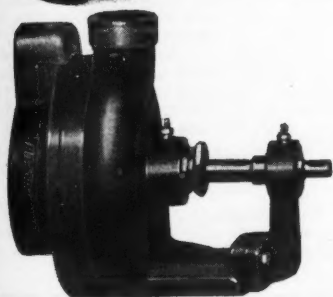
**THE DESMOND-STEPHAN MFG. CO. -:- Urbana, Ohio**

# COOL HEADS COOLED MACHINERY

*these too,  
will help  
U. S. win*



## COOLANT CENTRIFUGAL PUMPS



Scores of models . . . many types for standard uses . . . special types for out-of-the-ordinary purposes. But every model efficient, trustworthy, economical, and guaranteed satisfactory.

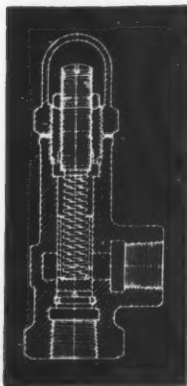
Sizes  $\frac{3}{8}$ " to  $1\frac{1}{2}$ " Pipe Sizes.

**Photograph shows Model  
FR54**



## BY-PASS OIL-RELIEF VALVES

Simple in design but a most valuable item in maintaining constant pressures. Five different springs for pressure variation. Pipe sizes  $\frac{1}{4}$ " to 2"; for pressures 0# to 350#. Cast iron or brass bodies, with brass, hardened steel or stainless steel pistons.



**Specialties Co., Inc.**  
BLANCHESTER, OHIO

temperature, and a latch cover automatically seals the top of the pot against air leakage during spraying.

Heating the contents of the pot up to the melting point requires approximately 12 minutes after the cord has been plugged into any convenient outlet. For production spraying, the gun can be kept filled from an auxiliary melting pot.

Actual spraying is accomplished by merely pressing a trigger on the handle of the gun, thus permitting air to either draw or force the metal through the nozzle of the gun. For work requiring extremely fine detail, a knob directly above the handle is turned to close a port into the pot and prevent air under pressure from entering the top of the pot. In this manner, only that amount of metal capable of being drawn off by the ejecting force of the air through the nozzle and working "against the vacuum in the pot" is sprayed. When the port is opened and air is permitted to enter the top of the pot, this additional air pressure combines with the ejecting force and thus increases the amount of metal deposited.

Designed for easy operation by unskilled workmen, the Alloy-Sprayer is supplied complete with gun containing electrical heating elements, insulated

melting pot, control handle, and nozzle. In addition, 15 feet of air hose to connect the handle of the gun with the pressure reducer and strainer at the air source, and 9 feet of cord with plug-in for electrical connection is furnished with each gun.

## Carboloy Standardized Shear Type Tools

Standardized designs of its shear type tools for interrupted cuts are announced by the Carboloy Co., Inc., 11143 E. 10 Mile St., Detroit, Mich. A feature of the tools is a large negative back rake which results in a shaving form of cut during turning or facing operations. Thus, when a tool is used for interrupted cuts, the impact load on the tool does not come at the end of the tip but farther back. In addition, the entry of the cutting edge of the tool into the cut after each interruption is gradual, starting at the point of contact back from the tip and working forward to the tip.

The Carboloy Standardized Shear Type Tools are available in four basic sizes in both left and right-hand types.

# DIAMONDS FOR VICTORY TO FIT YOUR NEEDS SET IN SPECIAL ALLOY



Tell us the machine you are using—the grit, size and speed of wheel, also kind of work being done.

We will quote you on a trueing tool that will give you results at the most reasonable cost.

Don't expect miracles—but you can expect service—based on experience—91 years of it! Send for data sheets and price list.



## SALESMEN WANTED

Big demand for our products. State qualifications fully. All information in confidence. Write — Some territories still available.



# E. KARELSEN, INC.

ESTABLISHED 1852

34 W. 43TH ST., NEW YORK, N. Y. Tel. VAN 4-3461

# UNION

## THE TOOLS YOU BUY AGAIN

Tools must be chosen with care for the jobs they have to do in tank, gun and plane manufacture, in shipbuilding and hundreds of other vital defense jobs.

Every Union tool is a precision tool, built to exact standards of ruggedness and accuracy, capable of sustained high production and lasting precision.

Choose them with confidence. We are sure that, on the toughest defense jobs, their performance will make them "The Tools You Buy Again."



## UNION TWIST DRILL COMPANY

ATHOL

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### STORES

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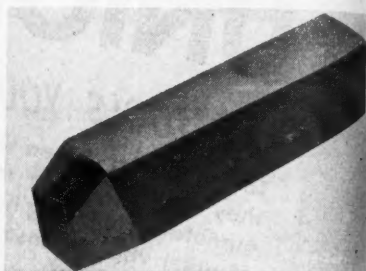


## PRODUCTION SPEED IN LAPPING HOLES

Copper Head Laps are highly recommended for lapping holes rapidly, accurately and economically. They are economical because they last a long time. The only wearing part is the adjustable copper sleeve which is quickly replaced when worn, with a new sleeve of correct size. • Sizes  $\frac{1}{8}$ " to  $2\frac{1}{2}$ " carried in stock.

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Shank sizes are 1 x 1 inch,  $1\frac{1}{4}$  x 1 inches,  $1\frac{1}{2}$  x  $1\frac{1}{2}$  inches, and  $1\frac{3}{4}$  x inches. All tools have a negative back rake of 40 deg. All relief angles are



Carboloy Standardized Shear Type Tool

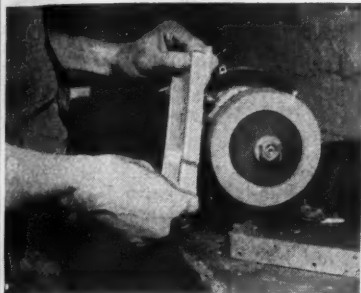
finish ground. The rear corner of the tool projects slightly above the top of the shank, thus permitting the use of a tool thick enough to provide maximum support sharpening while ensuring adequate support thickness of shank steel below the tip.

## Executone Executive-Monitor Communication System with Interceptor Control

An improved Executive-Monitor communication system consisting of two or more master stations connecting up to 19 remote stations is now being manufactured by Executone, Inc., 415 Lexington Ave., New York, N. Y. This system is said to be ideal for war production plants, military and naval departments where officers must talk to each other, to an executive assistant, and also to a member of remote departments.

The Executive and Monitor stations can be arranged so that persons at each station may talk to each other or so that either station may be used to carry on two-way voice-amplified conversations with remote desk or trumpet-type substations in outlying departments. An interceptor control feature enables the assistant at the Monitor station to intercept all incoming calls originating at the remote stations, thus allowing him to sift these calls and, at his discretion, transfer to the chief executive those important calls requiring executive attention. Any number of additional Executive and remote stations up to a total of 21 can be added to the system.

# Time The Operations! Compare The Results!



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"The Soft Rubber Binder Cushions the Abrasive"

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Brightboy's unique and effective action is neither a grind nor a buff. It is the in-between, "ideal" finish that production men have hoped for—now achieved by Brightboy. Unsurpassed for close tolerance finishing. The wheels de-burr, polish and put on a slight radius all in one operation. Special shapes have innumerable applications in manual work and drill press jobs. Available to war industries only—through recognized mill supply distributors. Brightboy field men are at your service. Write for catalogs and prices if your distributor cannot supply you.

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STICKS · TABLETS



Executone Executive-Monitor Communication System with Interceptor Control

Both Executive and Monitor stations are equipped with busy signals which illuminate to show when other stations are in use. The Executive station, however, has the optional facility of right-of-way over busy stations for emergency use. A paging button enables the user of any master station to call other stations simultaneously for paging and locating persons instantly and for issu-

ing emergency warnings or general announcements to the entire staff.

Persons called can reply remotely without leaving their work to approach the station. High powered trumpet-type substations provide extra sound volume to cover large space areas or penetrate high-noise levels. Push-button selection facilitates speed of operation.

All wiring lines of the Executone Executive-Monitor Communication System are connected to inconspicuous junction boxes for neat and simplified installation. The system is designed for operation on 110-120 volts, a.c. or d.c. Power consumption for the entire system is 46 watts.

### "Progressive" Low Pressure Welding Gun

When welding brackets or clips to light gauge alloy steels, light welding pressure is required in order not to deform the metal. A gun designed for such welding operations has been introduced by Progressive Welder Company, 3050 E. Outer Drive, Detroit. (See Fig. 1.)

Gun operating pressure is hydraulic

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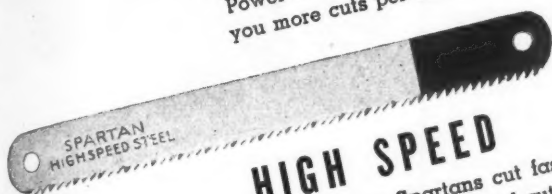


# Spartan



## KUTALL

Molybdenum or Special Alloy High Speed Hand and Power Hack Saw Blades. Faster and Tougher-Kutalls give you more cuts per blade!



## HIGH SPEED

These Power Spartans cut faster, wear longer and are stronger on any metal cutting job than ordinary blades.

Try either or both Spartan Kutall and Spartan High Speed Blades—they're manufactured and heat-treated by the latest methods to cut along with the best!

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**SPARTAN SAW WORKS, Inc.**  
Springfield  
Massachusetts

# HACK SAW BLADES

# Remember

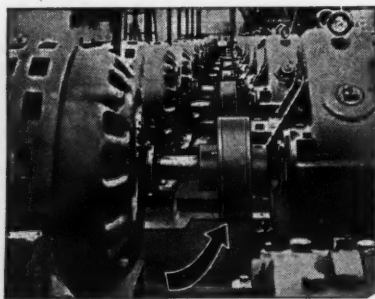
## KANTI-LEVER COUPLINGS

Keep your Productive Machines  
out of the Repair Shop

Shutting down a productive machine for repairs is a serious thing today—why run this risk when the KANTI-LEVER COUPLING will enable you to avoid it? The KANTI-LEVER not only protects you against the evils of shaft misalignment like the ordinary Coupling, but it injects a resiliency into the driving torque of your Motors that absorbs the reoccurring load shocks and the torsional vibration that are the main causes of wear, fatigue and final failure of all types of machinery. See the cut below showing 70 KANTI-LEVERS that have run continuously for over 18 years and paid back their cost many times by rendering uninterrupted operation and greatly reducing repairs.

Send for Bulletin 28-M describing

**Kanti-lever Couplings**



**BROWN**  
ENGINEERING CO. 120 N. THIRD ST.  
READING, PA.

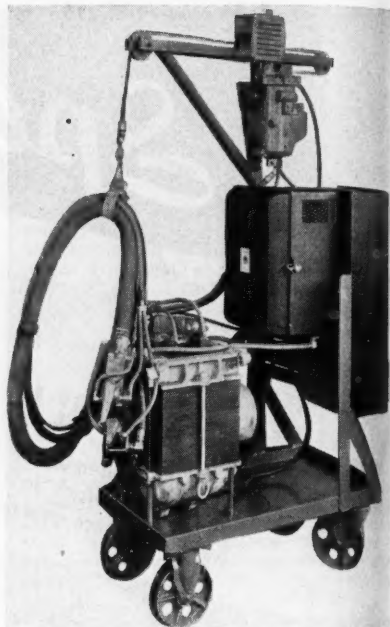


Fig. 1—Close-up of new "Progressive" welding gun designed for spot welding of light gauge alloy steels, where low pressure is required in order not to deform the work.

with partially counter-balancing continuous air pressure. The latter also serves to automatically retract the points when hydraulic pressure is released, thereby simplifying operation.

Features of the gun include screw-adjustable stroke (up to 3 inches) to take care of a wide range of work sizes, and quick interchangeable adapters for electrodes to make the gun suit-

## READING BENCH KEYSEATER

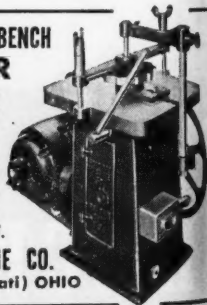
Portable—move directly to job; a time saver for both small and large shops.

4" stroke; adaptable for other work.

Low first cost—prompt delivery.

Good dealers wanted.

**READING MACHINE CO.**  
READING (Cincinnati) OHIO





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Inside Industry  
Too!**

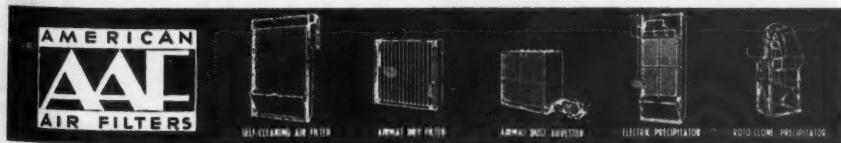


Bombs that rain from the sky take a terrific toll in destroyed property and lost lives. So every device is being used to protect industry and keep the wheels of production turning smoothly and swiftly.

But, the enemy **WITHOUT** is not the only destructive force which must be eliminated. Dust—like enemy bombs—dangerous and destructive, but much more insidious in the way it attacks—is the air-borne menace that strikes from **WITHIN**. Dust ruins irreplaceable machinery, spoils materials in process and impairs workers' efficiency.

Hundreds of existing plants and practically all new war production plants are now equipped with AAF air filtration and dust control equipment.

If you have a dust problem, our engineering service is available without obligation. Offices are maintained in 53 cities located throughout the country for the convenience of industry. Write direct for your copy of "AAF in Industry," a book which describes the complete line of AAF equipment. American Air Filter Co., Inc., 100 Central Ave., Louisville, Ky. In Canada: Darling Bros., Ltd., Montreal, P. Q.





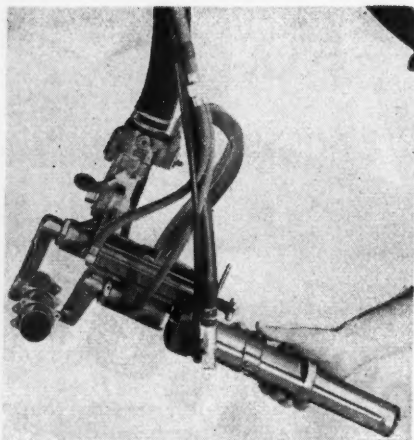


Fig. 2—The new Progressive low-pressure welding gun for light gauge alloys is available complete with transformer, controls, etc., as to portable unit.

able for a wide variety of work shapes. P-H concentric kickless and highly flexible welding cables and electronic

controls are used in the complete assembly which is shown in portable form in the illustration Figure 2.

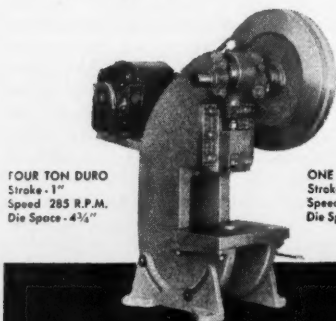
### Wilson No. 530 A.C. All-Position Welding Electrode

An electrode especially designed for all-position welding of mild steel with a.c. type welding machines has been developed by the Wilson Welder & Metals Co., Inc., 60 E. 42nd St., New York, N. Y. The electrode, which is designated as the No. 530, is available in diameters of  $\frac{1}{16}$ ,  $\frac{1}{8}$ ,  $\frac{1}{4}$ , and  $\frac{3}{8}$  inch, and is said to comply with all requirements of the American Welding Society Classification E6011, American Bureau of Shipping, Group H1G and B1G for a.c., and other specifications qualifying it for use on war work.

An outstanding feature claimed for the Wilson No. 530 A.C. All-Position Welding Electrode is the ease with which average operators can obtain good fusion and complete penetration with the electrode. The high quality of deposited metal of the No. 530 is said to be fully comparable to that of the best d.c. reverse polarity all-position electrodes.

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DURO, aircraft type, punch presses are constructed to precision punch aluminum, dural, and other sheet metal and plastic. Write today for illustrated catalog on Duro Punch Presses, Bench Milling Machines, and Accessories.



FOUR TON DURO  
Stroke - 1"  
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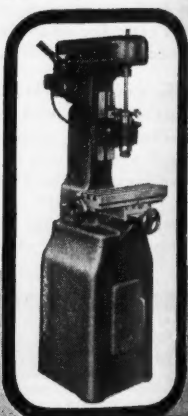
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with Micrometer Screw Feed Quill

Smooth, accurate boring to any predetermined depth up to 3". Direct reading eliminates errors.

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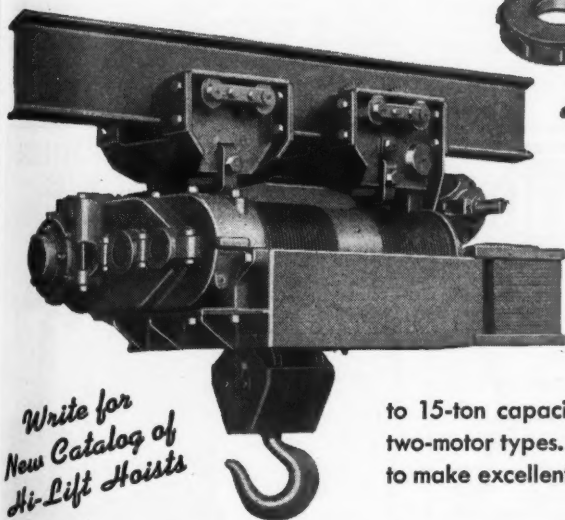
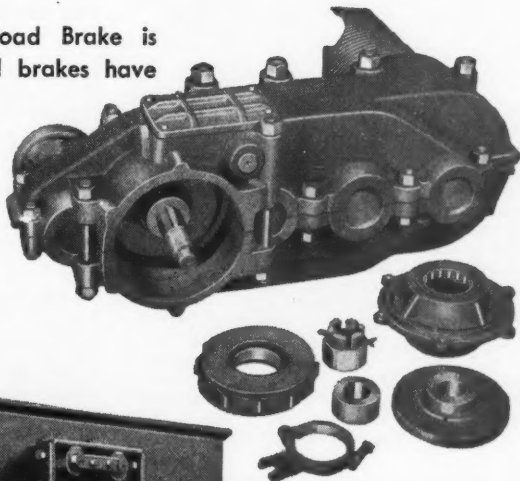


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# Mechanical Load Brake Renewals are infrequent but easy

The Northern Mechanical Load Brake is rugged, long-lasting. But all brakes have wearing surfaces which must be renewed at intervals. You can do it easily on the Northern Hi-Lift Hoist—loosen a few bolts, and brake mechanism is removed without disturbing gear case.



Northern Hi-Lift Hoists  
are built in 1000 lb.

to 15-ton capacity—in single motor and two-motor types. We are in good position to make excellent deliveries.

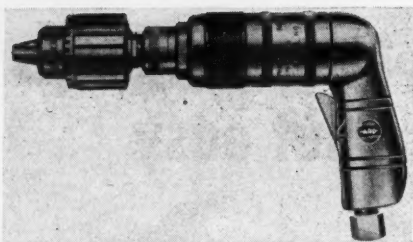
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New Catalog of  
Hi-Lift Hoists*

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**Aro 3/8-Inch Pneumatic Drill**

### **Aro 3/8-Inch Pneumatic Drill**

The Aro Equipment Corp., Bryan, Ohio, announces the addition of a 3/8-inch capacity drill to its line of rotary pneumatic tools. Designed for straight and right angle drilling, this tool is said to be suitable for use in performing a wide range of drilling operations in defense plants, shipyards, aircraft plants, and other industrial plants.

The drill is unusually compact for its capacity. Equipped with trigger control, it is light and easy to handle—especially in difficult places. The motor is of special design and is extremely powerful for its. The tool is easily disassembled when necessary for repairs.



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Standardized Die Sets, embodying many exclusive features, a listing of more than 195,000 stock sizes and 46 different styles afford a service that is unsurpassed.

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### **Silver-Finish Hardening**

A process whereby tools and parts of various type are said to be hardened without any discoloration, scale, carburization, decarburization, or change in surface analysis and with clean cavities, holes, corners, and threads, to be known as "Silver-Finish Hardening," is now being marketed by the Perfection Tool & Metal Heat Treating Co., 1740 W. Hubbard St., Chicago, Ill. Even polished tools so treated are said to retain their polish and appear as unhardened tools.

Silver-Finish Hardening can be applied to high speed steel, stainless steel, oil, water, or air-hardening steels, alloy steels, and, with certain limitations, to low carbon steel.

### **D-M-E Standard**

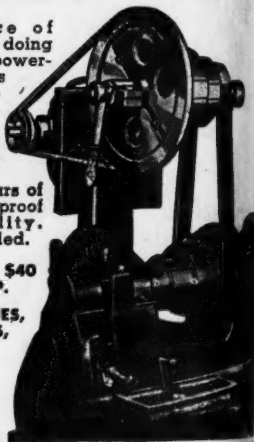
D-M-E Standards for use in preparing dies for injection molding have been developed by the Detroit Mold Engineering Co., Detroit, Mich. Designed to reduce die preparation time to a minimum, the Standards are made in sizes most generally used. A master drawing in heavy line supplied with each D-M-E

### **STEEGE MOTOR DRIVES FOR DEFENSE GUARANTEED FOR FIVE YEARS**

No chance of breakdown, doing a good job power-ing machines for defense production. No noise, floating cone, re-sults 100% power. 8 years of production proof of durability. Easily installed.

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Armament production men working on "impossible" completion schedules appreciate more than ever the value of BAY STATE's consistently superior abrasive products. Such "engineered-in" features as Fractional Grades, Controlled Porosity, and H-9 Vitrified Bond have eased to a tremendous degree their great task of obtaining maximum output in minimum time, with ever-increasing grinding efficiency.

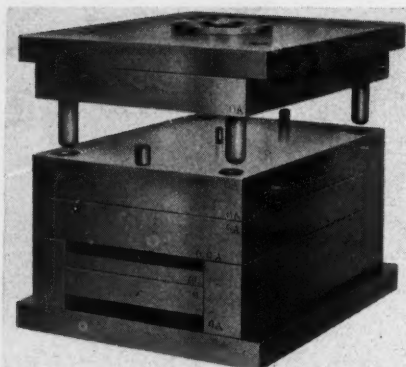
As a result of recent plant expansion and new tunnel kiln, deliveries are now better than ever. Use BAY STATE products for greater production!

Send for practical reference book containing a wealth of information on all types of grinding, including Foundry Wheels, Cut-Off Wheels, Mounted Points, Internal Wheel Recommendations, etc. Widely used for training apprentices, new operators and students. Yours on request.



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ABRASIVE PRODUCTS CO., WESTBORO, MASS. U.S.A.



D-M-E Standard

Standard contains all the details of the Standard, thus the designing of the base is eliminated and the work of drawing in the cavities is expedited.

Since the design provides rigid support for the back-up plate through pillars, the likelihood of sagging or settling of cavities is eliminated. The leader pins are purposely placed in unsymmetrical arrangement to guard against the possi-

bility of having parts reversed when put together. All parts are jig-drilled, thus making them interchangeable and permitting easy replacement.

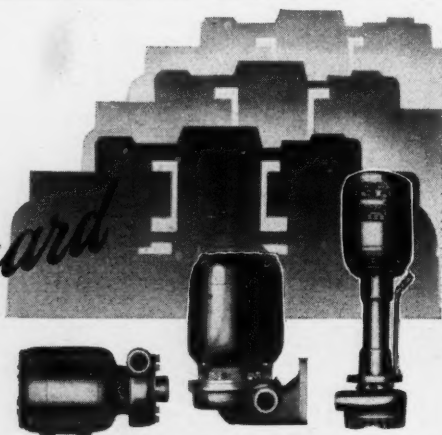
A D-M-E Standard comprises a complete die set ready for cavities, injector pins, and water lines.

### Gulf "Cut-Aid" Cutting Oil

Machines making parts for airplanes, tanks, ships, and guns are said to show increased production and longer tool life through the use of an industrial cutting oil known as "Cut-Aid" which has been announced by the Gulf Refining Co., Gulf Bldg., Pittsburgh, Pa. The oil is claimed to be ideal for machining aluminum, aluminum parts being machined so smoothly by means of the oil that in many cases parts need not be polished, thus eliminating a full step in production. The oil is also said to be excellent for cutting magnesium and nonferrous alloys.

Greatly increased penetration, cooling power, film strength, and "wetting" ability are outstanding features claimed for Gulf Cut-Aid Cutting Oil, which can be used alone or in combination with other cutting oils.

*On Guard*



in plants all over the country—are Pioneer Pumps—furnishing proper flow of coolants to the whirling wheels of machinery—to make sure that fighting equipment for Uncle Sam is being produced under most efficient conditions.

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**ACTUAL REPORTS SHOW**

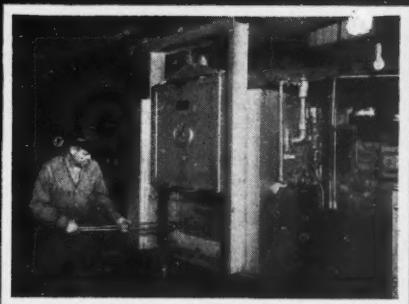
# **Big Increase in Production of TOOLS • DIES • PRECISION PARTS**

## *with* **DESPATCH FURNACES**

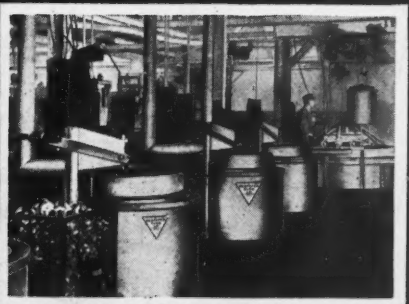
This is no time to compromise with production. Speedy, accurate heat treatment is needed to achieve the output of tools and dies scheduled for this year.

Actual reports show that greater production of tools, dies and precision parts is attained after the installation of Despatch furnaces.

Investigate the advantages of Despatch heat treating furnaces for your plant. 64 standard models, gas or electric, pot type or batch type furnaces available for prompt delivery. Also special models to suit any material handling necessary.



Despatch Batch Type Furnace, gas heated, processing steel springs in a midwestern metal plant



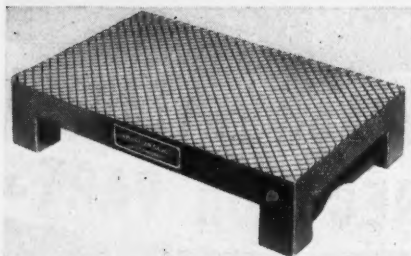
Battery of Despatch Pot Type Furnaces, electrically heated, processing bearing parts at a large eastern plant

**"Torrid"**  
The Heat Wizard  
Invites you to visit the  
Despatch Booth No.  
A-415, National Metal  
Congress, Cleveland,  
October 12th to 16th.

# **DESPATCH**

**OVEN COMPANY** MINNEAPOLIS, MINNESOTA





American Precision Lapping Plate

## American Precision Lapping Plate

A precision lapping plate for accurately lapping all types of gages and surfaces requiring close tolerances has been announced by the American Gauge Co., 128 Bayard St., Dayton, Ohio. The entire unit is 8 inches wide x 12½ inches long x 2½ inches high, thus enabling it to be conveniently placed on a tool-maker's bench.

The lapping plate proper is made of fine grade cast iron approximately 1½ inches thick, and is mounted on four legs. The surface of the plate is cut with 1½-inch grooves in a diamond pattern, the grooves being spaced ¼ inch

apart and at right angles to each other but at 45-deg. angles to the length and breadth of the plate. This lapping surface is produced by first grinding and then lapping the surface until it is perfectly flat, following which the grooves are cut in the surface, the grooves being so deep that surplus lapping compound will not accumulate on the surface. Plates can be easily reconditioned by lapping one plate against another.

## Vard Lathe Compound

Designed to reduce the number of manual operations involved in cutting threads as well as in other machining operations, the Vard Lathe Compound shown herewith, product of Vard Inc., Pasadena, Cal., is constructed in such a manner as to permit threads to be cut up to a working shoulder at normal lathe speeds. A supplementary attachment replacing the cross slide of the lathe, the compound is designed to hold a single or multiple tool post and is equipped with a micrometer control dial graduated to 0.001 inch for setting depth of cut, and quick release lever which, by means of one transverse motion of



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**GROBET FILE CO. of AMERICA**  
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## New, Accurate Tailstock Turrets

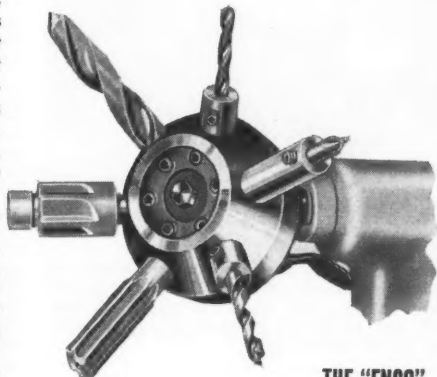
Ideal for engine and bench lathes—for special runs, small runs that come through regularly, or for relieving turret lathes. Holds six tools and comes complete with tapered arbor that fits in tailstock. Can be had with straight shank for increasing tool hole capacity on turret lathe. Tool holes are bored, after arbor is fitted to insure accurate centering of tools. Saves time in tool changing and chucking. Quickly pays for itself. Recommended by many users. Immediate delivery (except on Model B1 which requires two weeks). Order from your dealer or write for circular.

Model "A"—2½" dia. with 6 bored ⅝" holes No. 1 or No. 2 Morse Taper **\$18.95**

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Arbor Model "B1"—5" diameter with 6 bored ⅝" or 1" holes with ⅝" or 1" straight shank arbor for use on turret lathes... **\$37.95**

F. O. B. Chicago.



THE "ENCO"

### E & N Manufacturing Company

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(Dept. M)  
Chicago, Ill.

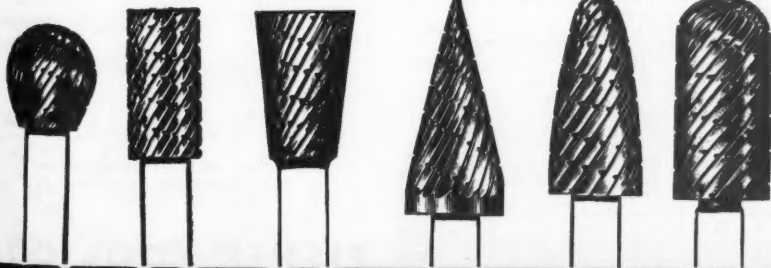
## Grobet

### Rotary Files

#### GROUND FROM THE SOLID

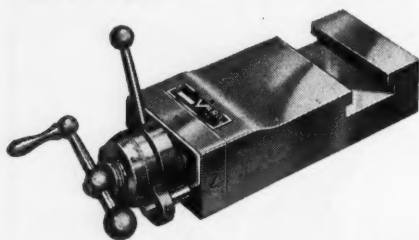
Ask for Catalog KG, the most complete catalog of its kind, illustrating hundreds of rotary files hand cut, milled cut, ground from the solid; also counter sinks and diesinkers' burs.

Also ask for Catalog K.F.; illustrating 5000 shapes and sizes Grobet 5-rss Files.



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the hand, withdraws the point of the cutting tool  $\frac{1}{8}$  inch after each cut has been completed.



Vard Lathe Compound

The Vard Lathe Compound may be easily installed on any 10-inch South Bend lathe. All working parts of the unit are made of special steel, ground and hand finished.

### Curran "Polar K" Oil

Announcement is made by the Chemical Development Laboratory of The Curran Corp., Malden, Mass., of a light

oil which is claimed to have the unique and valuable properties of completely removing perspiration, water, oil, and dirt from steel surfaces. The oil, which is known as "Polar K," is said to be particularly useful for dehydrating and cleaning steel surfaces, bearing, or similar parts which have become wet or have been left with a film of grinding emulsion.

Curran Polar K Oil is designed to instantly displace and absorb water and leave a thin film of rust preventive lubricant. The oil is said to be especially applicable for protecting the water side of steam turbines, water pumps, meters and steel parts exposed to rain, immersed in sea water, or stored in damp areas. The oil has also been found useful for spraying the inside of Diesel and gasoline engine cylinder walls which have accumulated a film of condensed moisture as a result of storage in damp atmosphere. Its use for flushing crankcases to remove sludge, moisture, and acid salts is also being expanded.

Curran Polar K Oil is completely soluble in hydrocarbon and lubricating oils and is said to require no subsequent cleaning procedure to remove the thin rust preventive film left on surfaces by the fluid.

## LOOK AT THESE FIVE FEATURES!

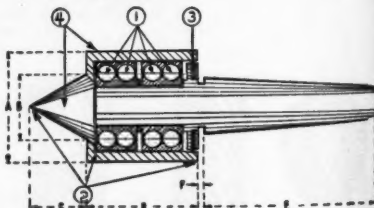
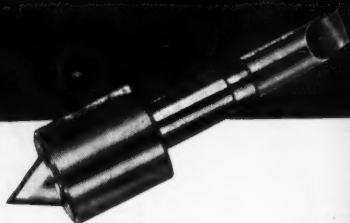
### of QUADRO Precision LIVE CENTERS

#### FEATURES . . .

1. **FOUR ROWS** of precision BEC-4 specification bearings.
2. **SHORT OVERHANG** assures rigidity and accuracy—eliminates "chatter."
3. **Positive FELT-SEAL** excludes dirt and retains lubrication.
4. **HARDENED AND GROUND CONE.** Point accurate to within .0002".
5. **HEAVY DUTY.** Note combined radial thrust load at 100 r.p.m.

#### DIMENSIONS

Morse Taper No.	A	B	C	D	E	Combined Radial-Thrust Load At 100 R.P.M.	Net Price
2	1%	$\frac{3}{8}$	$\frac{1}{2}$	$1\frac{1}{4}$	2%	1600	\$23.00
3	1%	$\frac{3}{8}$	$\frac{1}{2}$	$1\frac{1}{4}$	3%	3300	\$25.00
4	2%	$1\frac{1}{8}$	$1\frac{1}{2}$	$1\frac{1}{4}$	4%	7500	\$35.00
5	2%	$1\frac{1}{8}$	1	2%	5%	12000	\$47.00



All orders must be accompanied by extendable priorities.  
**WRITE TODAY!**

**FISHER TOOL CO.**

226 LAFAYETTE ST. NEW YORK, N. Y.

**DIAMOND WHEELS**  
RESINOID  
BONDED

**SECOMET**



#### FOR CARTRIDGE DIES

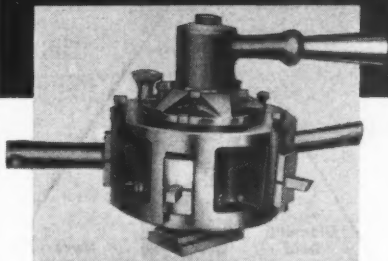
JKS resinoid-bonded Diamond Wheels for internal grinding of tungsten steel cartridge dies, produce straight holes of mirror-like finish — accurately, speedily and economically. Roughing and finishing wheel diameter 7/16 in.; length 3/8 in.; bore 1/8 in. Special sizes to order. Consult a JKS representative or write for folder.

*Prompt deliveries*

**J.K. SMIT & SONS, Inc.**  
157 Chambers St.  
New York  
N. Y.

#### SAVE TOOL BITS

Increase Production  
at Lower Costs



Index plate has 10 stops for 10 different tool settings. Bottom half of tool block oscillates in turret body and allows for minute adjustment of tool. Two set screws rigidly hold boring bar or tool bit. Tool blocks are interchangeable in 5 positions.

Equip your engine lathes with these economical Lathe Turrets to (1) save tool bits, (2) increase production, and (3) lower costs.

**Write for folder—today**



**Automatic  
Machine & Tool Co.**

132 CHARLES ST., AUBURNDALE, MASS.

# "TRUMORE" DIAMONDS

**NORTON  
HEX**



Diamond  
held  
securely  
in special  
nickel alloy.  
Any  
mounting.

Never  
wears  
dull.  
Requires  
no  
resetting.



Complete tool:  $\frac{1}{2}$  carat, \$3.50—  
 $\frac{1}{2}$  carat, \$7.50—1 carat, \$22.00.  
All sizes up to 5 carats in stock.



**IMMEDIATE  
SHIPMENT.**

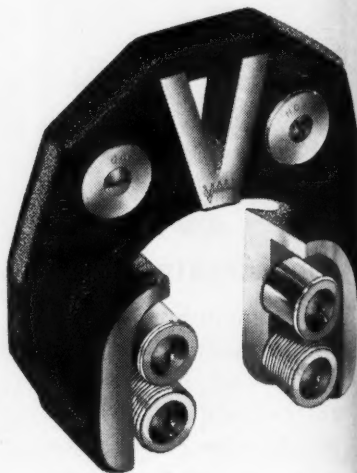
**WRITE  
TODAY.**

**F. F. GILMORE & CO.**  
112 DARTMOUTH ST. BOSTON, MASS.  
DIAMOND IMPORTERS AND TOOL MAKERS

## Vard Thread Roll Snap Gage

The illustration shows an improved thread roll snap gage which is now being marketed by Vard Inc., Pasadena, Cal. A visual checking gage, the unit is designed to check not only the pitch and thread form angle of the work under inspection but also the lead.

Constructed in such a manner as to permit it to be used flush against a working shoulder, the gage is equipped with precision rolls ground from special tool steel and fitted with eccentric pins



**Vard Thread Roll Snap Gage**

for adjusting the gage to size. The gage has a frame of sturdy construction and is provided with convenient machine pads for bench setups.

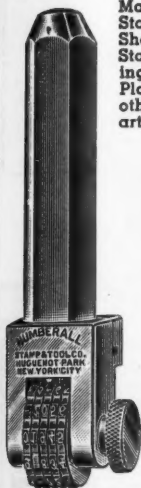
The Vard Thread Roll Snap Gage is available in a full range of sizes with tolerances from zero to several thousandths of an inch and in all pitches including metric.

## Clark Firmoke Brand Continuous Length Leather V-Belting

A line of continuous length three-ply leather V-belting designated as Firmoke Brand is now being marketed by the Victor R. Clark Belting Co., 606 W. Washington Blvd., Chicago, Ill. Longitudinal strength is concentrated in the section of the belting which straddles the pitch line. This section is con-

## Mark It Quickly with a NUMERALL

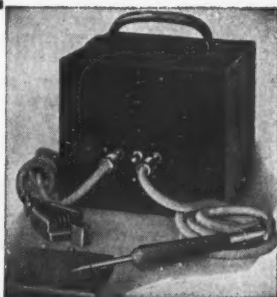
Made with 1 to 10 wheels.  
Stamp in perfect alignment.  
Shank for Hand or Press  
Stamping. Platform for stamp-  
ing Name Plates and  
other small  
articles.



NEW Quick Set Ma-  
chine. One wheel can  
be turned quickly by  
knurled knob for con-  
secutive numbering.

**NUMERALL STAMP  
& TOOL CO.**  
Huguenot Park,  
Staten Island, N. Y.

## MARK IRON, STEEL and CARBIDES



## THE ORIGINAL Etchograph

Mark tools, dies, gages and fixtures of any  
ferrous metals including the hardest alloys  
and carbides—quickly—plainly.  
Three sizes to meet all requirements. Also  
a combined Etchograph and Demagnetizer.

Write for circulars and prices.

**BREWSTER-SQUIRES CO.**

40 CHURCH ST.

NEW YORK

## STANDARD CUTTERS available from stock

WE LIST as STANDARD many cutting tools for-  
merly in the so-called "special" class. Better  
yet, the majority of these standard cutters is in  
stock most of the time. Our line is broad enough to  
often permit consolidation of tool orders thereby  
saving valuable time.

Cemented carbide tools are our *specialty*. We  
make them *exclusively*. Each tool is tipped with  
the *correct* grade of CARBOLOY best suited to  
do a cutting job on the metals for which the  
tool was ordered. (Other brands of carbide  
can be specified.) You can expect and get  
uniform, high quality results with Wendt-  
Sonis tools. Catalog 142 mailed FREE upon  
request. Ask for it! WENDT-SONIS COM-  
PANY, HANNIBAL, MISSOURI. Write or phone  
your requirements and priority rating.

**WENDT SONIS**

CARBOLOY CUTTING TOOLS

Centers • Flute Drills • Core Drills • Counterbores • Spot Facers  
End Mills • Reamers • Hollow Mills • Lathe Bits • Special Tools



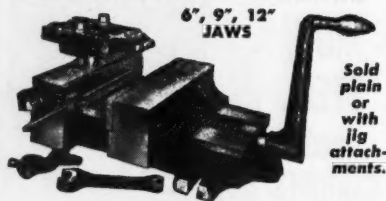
W-S Standard  
Reamers. Tapered  
and straight shank  
types.  $\frac{1}{4}$  up to  $1\frac{1}{2}$ .

W-S Carbide Tipped Centers.  
Morse, Browne & Sharpe  
and Jarno Tapers.

W-S Carbide Tipped Core  
Drills. Straight and tapered  
shanks. Sizes:  $\frac{1}{8}$  to  $1\frac{1}{2}$ .



## GRAHAM MULTI-PURPOSE VISE



with Attachments that convert it to a ready-made jig or fixture

For holding all sorts of repeat-operation work on drill press, radial, miller, shaper, planer, grinder, this versatile vise serves as a ready-made fixture by means of special jaws and attachments we furnish. Finished to accurate parallels and right angles. Also sold plain (drilled for adding attachments later.)

ASK ABOUT OUR KNURL HOLDER FOR LATHE TURRET

Request Illustrated Price Circulars

**GRAHAM MFG. CO.**

32 BRIDGE ST. EAST GREENWICH, R. I.

## Bond Gears and Speed Reducers

Ask  
for  
No. 59A  
Catalog

We will be glad to quote—  
Send us your specifications.

Manufactured by

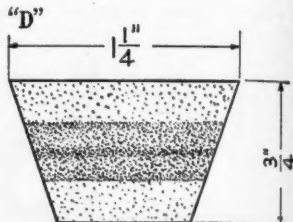
CHARLES

**Bond**

COMPANY

617-621 ARCH STREET PHILADELPHIA, PA.

structed of tough, high tensile strength stretch-resisting, firm leather. The top and bottom plies of the belting are of firm, wear - resisting, elastic leather which spreads and grips the pulley sides

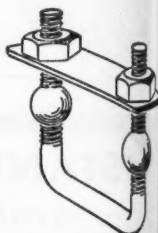


Section of Clark Firmoke Brand Continuous Length Leather V-Belting

as the belting arcs over the pulleys.

Clark Firmoke Brand Continuous Length Leather V-Belting is said to be waterproof and oil-resistant, and is available in sizes of  $\frac{1}{2}$  x  $\frac{11}{16}$  inch,  $\frac{21}{32}$  x  $\frac{11}{16}$  inch,  $\frac{1}{2}$  x  $\frac{17}{32}$  inches, and  $\frac{11}{16}$  x  $\frac{3}{4}$  inch.

A ball bearing fastener for holding end of belting snugly together is also being marketed by the company. This fastener requires no special tools for application and is available in four sizes for use with the various sized belting listed above.



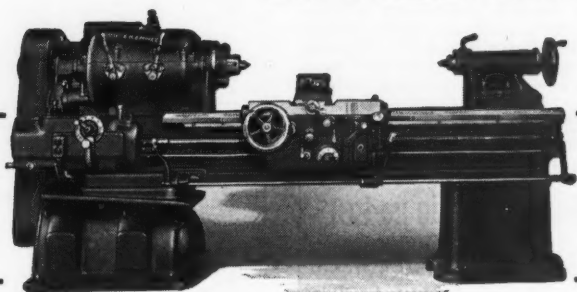
Clark Ball Bearing Fastener for V-Belting

## "Pro-Tek" Protective Cream

Designed for use by workers whose hands are exposed to oil, grease, solvents, or paints, a non-medicinal protective cream to be known as "Pro-Tek" is announced by E. I. du Pont de Nemours & Co., Wilmington, Del. The cream is a greaseless substance which is applied to the hands, arms, and under the nails before starting work. The cream forms an invisible film which provides physical protection against grime and various irritating substances, and at the end of the working period, can be washed off with soap and running

# BOYÉ & EMMES

## ENGINE LATHES



**THE BOYÉ & EMMES MACHINE TOOL CO.**  
CINCINNATI • OHIO

## Robertson's ECONOMY Power Hack Saws

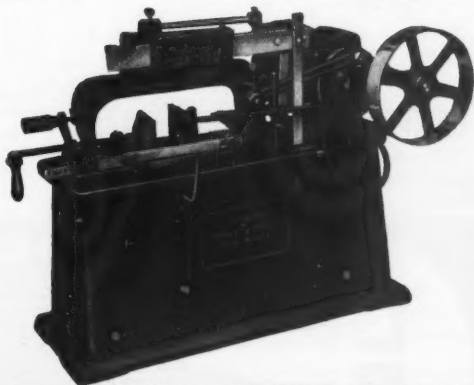
### FEATURES

Rugged Simplicity      Long Life  
Hairline Accuracy      High Speed  
Long Blade Life      Large Bearings  
Few Adjustments  
Hydraulic Lift on Back Stroke

The machine illustrated is the  
ROBERTSON ECONOMY No. 3-B.  
Capacity: 6" x 6" with 6" stroke.  
Takes 10", 12", 14" blades.

There is a ROBERTSON ECONOMY for every cutting job.

Write for information  
and delivery dates.



**W. ROBERTSON**  
**MACHINE & FOUNDRY CO., INC.**

32 RAND ST.

BUFFALO, N. Y.

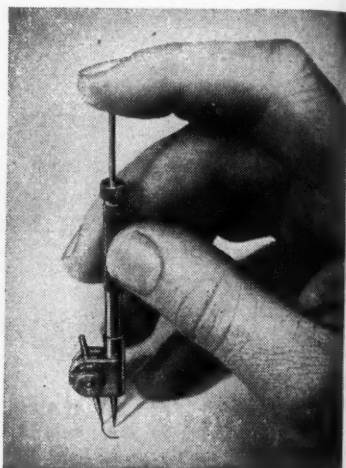
water, thus eliminating the need for strong solvents or harsh abrasives.

### Ithaca Toolmaker's Compass

An instrument for use by metalworkers and draftsmen for scribing and drawing accurate circles from a few thousandths to  $\frac{1}{4}$ -inch radius, to be known as the Ithaca Toolmaker's Compass, is now being manufactured by the Ithaca Scientific Instrument Co., Ithaca, N. Y. The compass is supplied in durable case complete with scribing needle,

pencil adapter, and supply of leads.

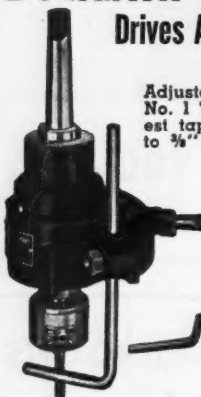
The body of the compass slides up and down and rotates about the stationary pivot needle of the instrument, and is



Ithaca Toolmaker's Compass

## DORMAN TAPPERS

Drives Any Tap up to 1"



Adjustable Friction Drive  
No. 1 Tapper drives smallest tap in softest material to  $\frac{1}{8}$ " tap in steel.

No. 2 Tapper drives from  $\frac{3}{8}$ " to  $\frac{1}{2}$ ".

No. 3 Tapper drives from  $\frac{1}{2}$ " to 1" in steel or other material.

**PROMPT DELIVERY  
ON ALL SIZES**

Convert your Drill Presses to Tappers in 2 minutes.

Write for details.

**Dorman Machine Tool Works**

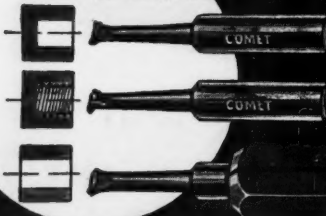
357 Canal St.

New York, N. Y.

provided with a hardened lapped bushing to ensure an accurate slide fit on the pivot needle. A knurl located at one end of the compass body actuates a worm gear for setting radius of compass. The worm gear is provided with a clamp nut for locking after a setting has been made. The Ithaca Toolmaker's Compass is also provided with a nut for locking scribing needle and pencil adapter at desired length.

The instrument is made to fine limits of precision, and the workmanship is of the highest quality.

## COMET Internal Threading and Boring Tools



For holes from  $\frac{1}{16}$ " upwards 15 Different Sizes. The accurate thread angle is maintained through easy sharpening until tool is entirely worn down. See head—long cutting surface for regrinding.

Write for complete data.

**COMET TOOL CO.**

738 Broadway, New York, N. Y.

This m  
and se

GEOR  
1806

The  
PULL

Pullmore  
thing for  
high grade  
simple, e  
machine  
incorpora  
costs, pro

The Axel  
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promptly

Pullmore

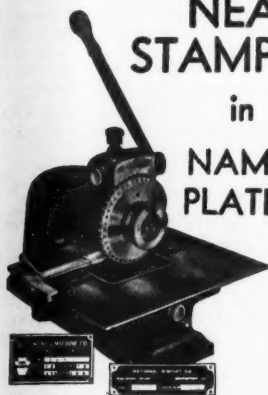
ROCK  
300

Over-C

October,

## NEAT STAMPING

in  
NAME  
PLATES



**Nameplate Detail Press**

This machine quickly stamps details and serial numbers into name plates.

*Write for Particulars*

**GEO. T. SCHMIDT, Inc.**  
1806 Belle Plaine Ave. Chicago, Ill.



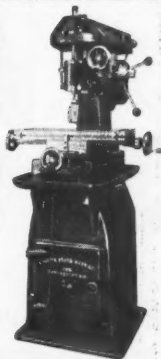
## Vertical Mill and Jig Borer

A simplified, precision tool for milling, boring, facing and routing small parts for instruments, arms and munitions in tool, die and machine shops.

Spindle dia. at driving end,  $\frac{1}{2}$ " 1150 and 1750 r.p.m., 5 speeds. 12" longitudinal travel of table, 7" cross travel. 4" spindle feed.

*Write for folder.*

**A G & S Representative**  
in all principal cities.



**Granite State Machine Co., Inc.**  
MANCHESTER NEW HAMPSHIRE  
Exclusive Selling Agents  
**H. Leach Machinery Co.**  
387 Charles St. Providence, R. I.

## They Have Everything For Machine Tool Drives...

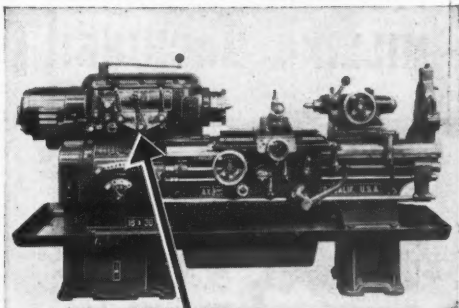
### PULLMORE CLUTCHES

Pullmore Multiple-disc Clutches *have everything* for service in machine tools and other high grade equipment. Notably compact, simple, efficient and durable they are the machine designer's logical choice—readily incorporated into drives, cutting installation costs, promoting most effective performance.

The Axelson 16" heavy-duty lathe illustrated is described as a "quality controlled" product because exacting standards govern manufacture. A Double Pullmore, handling duplex functions as a forward-reverse clutch, provides top quality in spindle drive control.

Pullmore Clutches are unexcelled for any type of mechanical, electrical, hydraulic or manual operation, extensively used in machine tools, lift trucks, packaging machines, hoists, and many other applications. They have exceptionally fast, smooth engagement; run free when disengaged; remain cool under frequent operation. Pullmore Blue Book gives full description, examples, engineering data; sent promptly on request.

*Pullmore clutches are sold by Morse Chain Co. offices in principal cities*

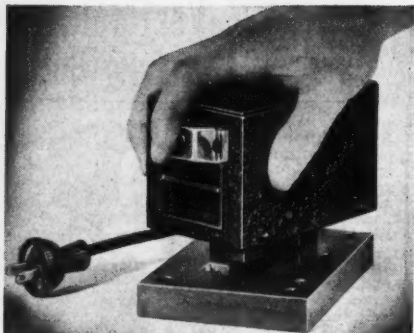


**Double Type  
Pullmore**

Pullmore Clutches are made single and double, for operation in oil or dry, in many capacities up to 90 h.p. at 500 r.p.m.

**ROCKFORD DRILLING MACHINE DIVISION** Borg-Warner Corporation  
▼ 300 CATHERINE STREET, ROCKFORD, ILLINOIS, U.S.A. ▼

Over-Center Clutches • Spring-Loaded Clutches • Pullmore Clutches • Power Take-Offs



Red "E" Portable Demagnetizer

### Red "E" Portable Demagnetizer

Especially designed for use in demagnetizing work too large or too cumbersome to be readily portable, the Red "E" Portable Demagnetizer shown in the illustration has been placed on the market by the Grinding Machinery Co., 2832 E. Grand Blvd., Detroit, Mich. The demagnetizer can be carried in one hand wherever needed and is designed for

plugging into any 110 volt 60 cycle circuit. The unit is operated by pressing a convenient finger control button and drawing over parts to be demagnetized. The unit may also be turned bottom up and used as a bench demagnetizer.

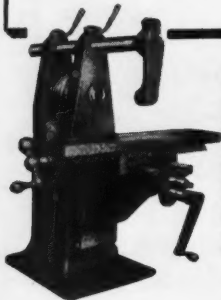
The Red "E" Portable Demagnetizer is 5 x 3 x 3 inches high and weighs 4¾ pounds.

### Improved "Quick Way" Twist Drill Grinding Fixture

An improved "Quick Way" Twist Drill Grinding Fixture for use in grinding all drills from No. 20 to 2½ in. is announced by the Industrial Engineering Co., Inc., 311 6th Ave. S., P. O. Box 433, Minneapolis, Minn. The fixture is built in two parts. The upper frame is interchangeable and is made in three sizes to grind drills within their proper size range from No. 20 to 2½ in., and with three proper angles and clearances for grinding drills for drilling in hard and soft metals.

The Quick Way Twist Drill Grinding Fixture can be quickly attached to any Black & Decker, or Van Dorn, grinder, and any other makes of grinders that

## YOUR CHANCE TO OWN A MILLING MACHINE!



• Build it yourself! Available as foundry castings or semi-machined. Semi-machined mill requires only a lathe and drill press to complete. Includes all necessary materials, blueprints and instructions. Thousands sold and in use all over the world!

Write for catalog.

DELIVERIES  
MADE FROM  
STOCK.

**Lewis**  
MACHINE TOOL CO.

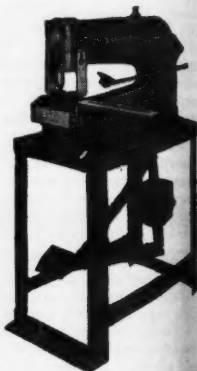
Box 116, Station A, Dept. T10,  
Los Angeles, California



## WHITNEY-JENSEN TOOLS

### TOGGLE ACTION FOOT PRESSES

These machines have a powerful linkage that MULTIPLIES foot power to provide fast, EASY action on punching and forming operations, and light production work. Capacity 2" hole in 16 ga. iron. Available in four sizes, 7", 10", 18", or 24" throat depth.



**Whitney Metal Tool Co.**  
110 FORBES ST. ROCKFORD, ILL.



## PADDOCK Ball Bearing BANDSAW GUIDES

Reduce Blade  
Breakage  
Increase  
Production

Easily adjusted to all sizes of blades to 1½" wide.

Recommended for new and old machines running at any speed cutting all materials.

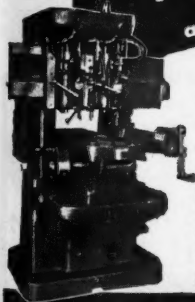
**Shipped on 10 day approval**

**PADDOCK TOOL CO.**

1418 Walnut St. Kansas City, Mo.

Preloaded Precision Bearings for Spindles

## MOREY 12M HIGH-SPEED VERTICAL PROFILER and MILLER



Two spindle or single spindle

Speed and more speed in the production of interchangeable parts requiring milling of any contour or outline is yours in the MOREY 12M. Provision for increased clearance between spindles and table.

Ask for Bulletin 680-A

**MOREY MACHINERY CO., INC.**

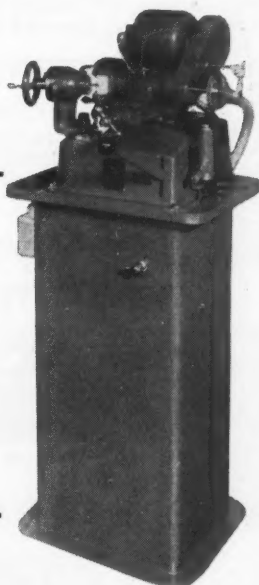
410 Broome Street

New York, N. Y.

## HYBCO TAP GRINDERS

for Sharpening

Chamfer -- Flutes -- Spiral Points



Capacities: No. 2 Machine Screw to 1½" Hand Taps — 2 to 10 flutes—right and left hand taps —possible by selection of proper heads.

All taps can be held by shank in precision collets, can be sharpened after center is destroyed.

Write for Circular.

**HENRY P. BOGGIS & CO.**

1279 W. 3rd ST.

CLEVELAND, OHIO



have the same dimensions of wheel guards. For grinders with different dimension frames, the bracket for attaching the fixture can be made on the job by the user according to directions supplied.

### American Steel Shop Boxes

American Metal Works, Inc., 1519 Germantown Ave., Philadelphia, Pa., is now marketing a line of steel boxes for use in the handling and storage of parts in the machine shop. The line consists

of four styles of boxes; namely, Style 100 taper pans, Style 400 straight side shop boxes, Style 500 stacking bins, and Style 600 stacking boxes.

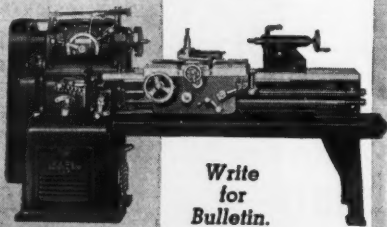
The Style 100 taper pan is of one piece, all-welded construction, with hook handle at each end, and is designed so as to nest perfectly when empty. The Style 400 straight side shop box has a rigid handle and hook handle at each end and is said to be excellent for shop use where stacking feature is not required.

The Style 500 stacking bin, it is claimed, is particularly useful for the storage and handling of small parts. The bin is designed so that when stacked contents are readily accessible. The Style 600 stacking box is an ideal all-purpose box of sturdy all-welded construction. Heavy skids act as a positive stacking lock and reinforce box at point of maximum wear.

### CARROLL AND JAMIESON LATHES 15" AND 16"

12 Speed Geared  
Head Motor Drive  
Timken Mounted  
Spindle.

Modern Design—  
Liberal  
Dimensions



Write  
for  
Bulletin.

THE CARROLL & JAMIESON  
MACHINE TOOL CO.

KATAVIA OHIO, U. S. A.

### Walker-Turner 20-Inch Power Feed Drill Press

A 20-inch power feed drill press for power feed, hand feed, and foot feed applications has been brought out by the Walker-Turner Co., Inc., 7121 Berckman St., Plainfield, N. J. The unusually rugged construction of the machine is said to make it ideal for production work.

An outstanding feature of the machine is the power feed unit. A built-in clutch, which is part of the worm drive of the unit, assures smooth, positive action at all points of spindle travel.

In keeping with the accepted practice the unit is powered from the drill press spindle, four rates of feed speed being provided for each of the five spindle speeds. An easily read chart indicates

## "OUTWEARS

the best

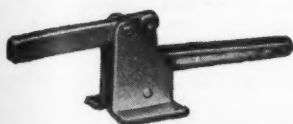
## Bronze Metal"

20 years ARGUTO without  
K. R. a drink—

## ARGUTO OILLESS BEARING CO.

Wayne Junction, Philadelphia, Pa.

## DROP FORGED CLAMPS



### Extra Strong—Longer Life

Products Engineering Company's quick acting jig clamps are the only drop forged clamps available—they're stronger—have exceptional opening and closing speed and a positive lock impervious to pressure and vibrations—it pays to specify them. Available in many models and sizes from midget to 6" clamping bars. Send today for file size catalog.

### PRODUCTS ENGINEERING CO.

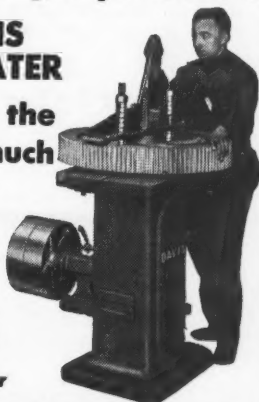
700 E. FLORENCE AVE., LOS ANGELES, CALIF.

## Why Use A Shaper to cut Keyways when a

### DAVIS KEYSEATER

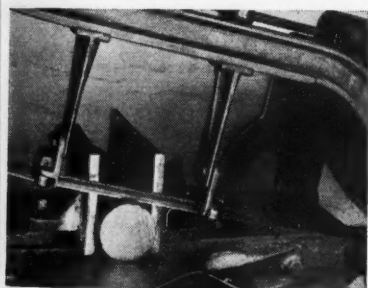
will do the  
job so much  
quicker  
and  
better?

Send  
for  
Circular



### DAVIS KEYSEATER CO.

Exchange and Glasgow Sts.  
ROCHESTER, N. Y.



Special Box, Convenient  
to Use

## ATLANTIC ★ Band Saw Blades Speed Up

### Metal Cutting Production

Atlantic Metal Cutting Band Saw Blades have been developed through twenty years of research and specialization.

Send for Free  
Booklet

### ATLANTIC SAW MFG. CO.

Metal Cutting Band Saws  
Exclusively

155 Brewery St., New Haven, Conn.

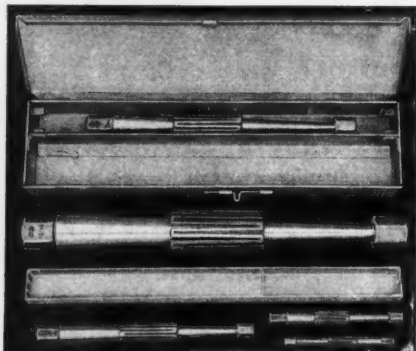


the rate of feed in thousands of an inch per revolution of spindle.

The Drill Press is designed to handle all drilling and reaming operations from 1 inch in cast iron down to  $\frac{1}{16}$  inch. The machine is equipped with a No. 2 Morse taper spindle nose and is available in single spindle or four spindle models.

## Master Tri-Square

A Master Tri-Square suited to extreme precision measurement wherever 90-deg. angles are involved is now being



M101 Set has a range from  $\frac{3}{8}$ " to  $2\frac{1}{2}$ ".

No.	Range	Wt.	Price
M0	$\frac{3}{8}$ " to $\frac{1}{2}$ "	$\frac{3}{8}$	\$ 4.50
M1	$\frac{1}{2}$ " to $\frac{5}{8}$ "	$\frac{3}{8}$	5.75
M2	$\frac{5}{8}$ " to 1"	1	7.75
M3	1" to $1\frac{1}{8}$ "	$2\frac{3}{4}$	12.00
M4	$1\frac{1}{8}$ " to $2\frac{1}{2}$ "	9"	22.00
M5B	$2\frac{1}{2}$ " to $3\frac{1}{4}$ "	$17\frac{1}{4}$	44.50
M5C	$3\frac{1}{4}$ " to 4"	$30\frac{1}{4}$	44.00
M55	$3\frac{1}{4}$ " to $4\frac{3}{4}$ "	$42\frac{1}{4}$	89.00
M6B	4" to $4\frac{3}{4}$ "	38	70.00
M6C	$4\frac{3}{4}$ " to $5\frac{1}{2}$ "	53	76.00
M5	$2\frac{1}{2}$ " to 4"	$42\frac{1}{2}$	68.50
M6	4" to $5\frac{1}{2}$ "	78	100.00

Immediate delivery of these sizes from stock.

Write or wire for bulletin M42-10M.

**K. O. Lee Company**

Aberdeen, South Dakota

produced by the Jansson Gage Co., 19208 Glendale, Detroit, Mich. Held to limits of 0.00002 inch base and side, the gage is available in two sizes—4 inches in height with  $\frac{5}{16}$ -inch wide standing base and 6 inches in height with 1-inch wide base.

Of one-piece construction, the Master Tri-Square is made from hardened, ground, and lapped alloy tool steel, and is provided with an inset hard fiber serrated grip to prevent heat transference and slipping in handling. The vertical side edge is knife-sharp for true visual gaging.

The Master Tri-Square can be used in laying out and checking right angle work and square surfaces, and checking V's, straight flat edges, and parallelism of cylindrical surfaces.



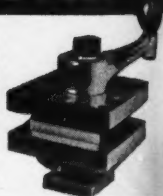
Master Tri-Square

## Gunk XP-92

A hand-wiping safety solvent to be substituted for naphtha, gasoline, or kerosene, to be known as Gunk XP-92, has been developed by the Research and Development Laboratory of The Curran Corp., 6 Pleasant St., Malden, Mass. The material is designed primarily for removing cosmoline from rifles. It is also said to be applicable for wide industrial use as a naphtha substitute for grease-cleaning and hand-wiping opera-

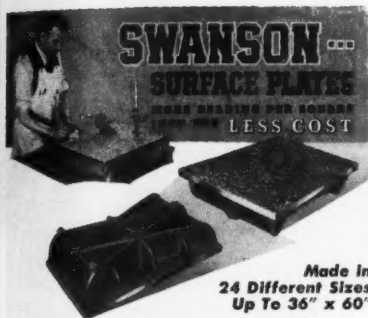
## TURRET TOOL POST

Hardened throughout, self-compensating for wear, precision built. For top production on small South Bend, Sheldon, Clausing, Atlas, Logan and similar bench lathes and small screw machines.



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**Swanson Tool & Machine Corporation**

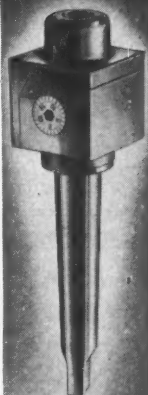
810 East 8th St., Erie, Pa.



*Lead screw ground  
from the solid  
AFTER hardening*

**S**MOOTH and compact.  
Constant accuracy.  
Parts subject to wear  
are hardened. Large offset  
adjustment eliminates need for  
offset boring bars. Lead screw  
is hardened tool steel. Its threads  
are ground from the solid  
AFTER hardening.  
Criterion heads are unexcelled  
in accuracy, in ability to with-  
stand constant use. Two sizes  
1½" and 3". ½" and 1" bar  
capacity. Order from your  
dealer or write direct Request  
free literature. No obligation.

**CRITERION**  
*Boring  
Head*



**CRITERION**  
MACHINE WORKS  
BEVERLY HILLS, CALIFORNIA

## Worth Building Your Whole Machine Around!

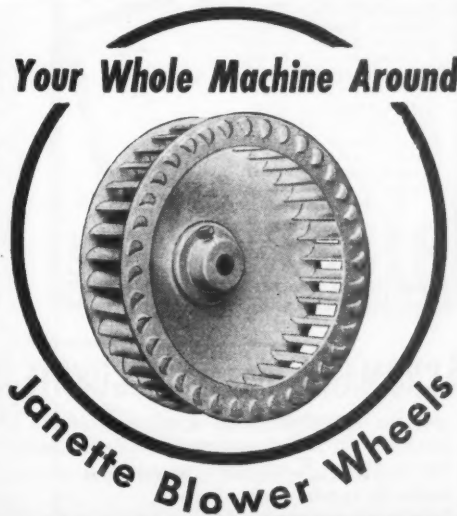
### DISTINCTIVE FEATURES

The soft steel blades are made in pairs,  
pressed thru slots in the heavy steel  
back plate, then welded to the plate.  
The blade tips are pressed thru slots  
in the inlet disc then bent back against  
the spring of the steel blades. This pat-  
ented construction results in an excep-  
tionally rigid wheel and prevents loose  
blades, as no rivets are used in fasten-  
ing the blades.

The heavy cast iron machined hub is  
riveted to the back plate and will not  
crack or become loose on the driving  
shaft.

### SIZES

5" x 1" to 12" x 6"  
5" x 5" to 12" x 12"



**Janette Manufacturing Company**

556-558 West Monroe Street Chicago, Ill. U.S.A.

tions in ordnance or shell plants.

According to the manufacturer, Gunk XP-92 does not de-oil the skin, has no toxic vapors, has no flash or fire point, and leaves an invisible rust preventative film so thin it cannot be detected.

### Sterling R-878 Flame-Resistant Insulating Varnish

The Sterling Varnish Co., 168 Ohio River Blvd., Haysville, Pa., has developed a flame-resistant insulating var-

nish designated as R-878 which is recommended for Class B high temperature insulation. The varnish is said to be mechanically strong and to dry all

# STEEL AVAILABLE



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Steel \* Strip Steels \*  
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Steels \* Tool Steel  
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FREE CATALOG

## BISSETTSteel

945 E. 67th St. • Cleveland, Ohio • Henderson 0995



Illustration showing large electrical units, the windings of which have been coated with Sterling Flame-Resistant Insulating Varnish.

the way through when applied to electrical apparatus.

After drying, R-878, it is claimed, will not support combustion, neither will it melt nor resoften under operating temperatures. Sterling R-878 Varnish is said to have all the characteristics of high grade insulating varnishes.

### Johnson No. 820 Tempering and Drawing Furnace

The Johnson Gas Appliance Co., Inc.

## ACROMARK means "ACCURATE MARKING"

and the ACROMARKER is only one of the FAST but simple machines our skilled workmen build for marking.

This machine is provided in several sizes and special fixtures are made for special work.

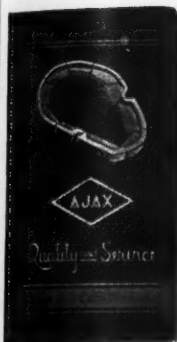
Send us your marking problem—Priority deliveries are FAST.

WRITE FOR CATALOG No. 52.

**THE ACROMARK CORPORATION**

9 MORRELL ST., ELIZABETH, N. J.





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*Valuable*  
*Booklet*  
**Forgings**  
**for All Industries**

**Rough Turned or  
Finished Complete**

Composite Die Sections, Extrusion Tools,  
Crankshaft Forgings, Gear Forgings, Die Cast-  
ing Dies.

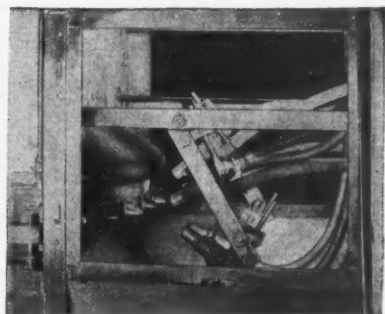
Rings, Discs, Blocks, Shafts, Hubs, Bars, and  
Special Shapes. Tool Steel of All Makes.

S.A.E. Specifications.

Stainless and Copper Forgings.

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205 ADAIR ST. DETROIT, MICHIGAN



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**ROTATING-FIXTURE**

**MULTIPLE-NOZZLE**

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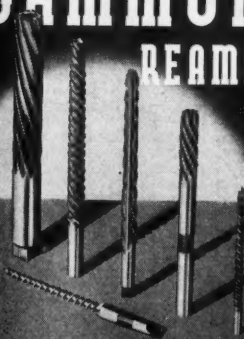
Complete outfits for shells of all  
calibres—also for all classes of  
work in metal, plastics, glass,  
composition, bakelite, etc.

**Rapid Delivery To  
Speed War Success**

**LEIMAN BROS. INC.**

**168-2 Christie St.  
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## **GAMMONS REAMERS**



*Manufacturers of*

The Gammons Helical Taper Pin Reamer

The Gammons Helical Chucking Reamer

The Gammons Helical Die Makers Reamer

The Gammons Duplex Taper Pin Reamer

Special reaming problems invited

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**THE GAMMONS-HOAGLUND CO.**  
MANCHESTER CONNECTICUT



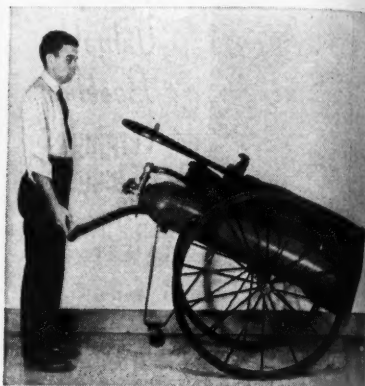
E Ave. N. W., Cedar Rapids, Iowa, announces the addition of the new No. 820 tempering and drawing furnace to its line of industrial furnaces. Designed to speed the tempering of tools, dies, small parts, and non-ferrous castings and parts, the furnace, it is claimed, can be used for any work requiring a temperature range from 275 to 1,200 deg. Fahrenheit.

Designed as a production furnace, the 820 is compact and is said to require very little floor space. It is heavily lined with insulating refractory and equipped with two large Johnson atmospheric burners. The counterbalanced, self-aligning door is constructed to reduce heat loss to a minimum and is easily controlled by means of a crank at the left of the operator. The firebox size of the 820 is 16 x 16 x 14 inches, and the furnace is equipped with two Allegheny metal shelves.

### "Alfite" 100-Lb. Carbon Dioxide Engine

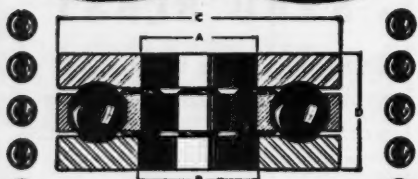
Known as the "Alfite," a 100-lb. carbon dioxide engine which has been approved by Underwriters' and Associated Factory Mutual Laboratories for use in

extinguishing both electrical and fires is now being manufactured by the American-LaFrance-Foamite Corp., Es



"Alfite" 100-Lb. Carbon Dioxide Engine

mira, N. Y. A feature of the unit is an Anti-Statik horn which is designed to protect the operator from static charge. In addition, the engine is designed for perfect balance at wheeling height, ha



### TYPE GB GROOVED RACES BALL THRUST BEARINGS

STANDARD SIZES OR SPECIAL DESIGN to your specifications; send sketch or worn sample, regardless of condition, for quotation, without obligation. • Our complete catalog will help you in making selection of bearings—shall we send it?

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358 Furman St., Brooklyn, N. Y.

*In* **PRODUCTION and COMBAT** *alike*

**GITS OILERS**  
are providing one of the most essential requisites of mechanized warfare, that of positive lubrication under extreme conditions. Every lubricator in this line is designed to a specific need. The Gits Line offers a dependable answer to every lubricating problem, large or small.

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1848 South Kilbourn Avenue • Chicago, Illinois  
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**AUTOM**



## CONTINUOUS HINGES

Manufactured by

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& MFG. CO.**

2326 S. CANAL ST.

CHICAGO

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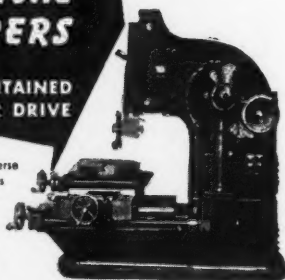
Accurate, High-Speed

## MOREY VERTICAL SHAPERS

SELF-CONTAINED  
MOTOR DRIVE

power rapid transverse  
feeds in all directions

Timken Tapered  
Roller Bearings for  
Main Spindle—all  
others anti-friction.



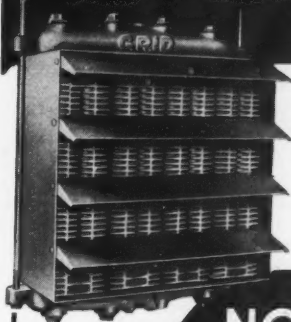
Built to highest accuracy standards the MOREY VERTICAL SHAPER is simple for tool-room manufacturing. Power feeds and power rapid transverse feeds in all directions are instantly available in all operating positions.

Ask for Circular 726

**MOREY MACHINERY CO., INC.**  
410 Broome Street New York, N. Y.

8" STROKE  
12" STROKE  
14" STROKE

## IT'S STILL A *different* UNIT HEATER



Cast iron takes the place of aluminum for the heating sections, to co-operate with the war effort in using substitute materials.

**NOW  
made with  
CAST IRON  
Heating  
Sections**

A special design for performance. Patent applied for. The new Grid is engineered along the same lines as the Grid Unit which had aluminum heating sections.

No corrosion—no leaks or breakdowns . . . In this new Grid Unit there is only one type metal in contact with steam or hot water. There is nothing to cause electrolysis that produces corrosion. Engineered and constructed to withstand up to 250 lb. steam pressure.

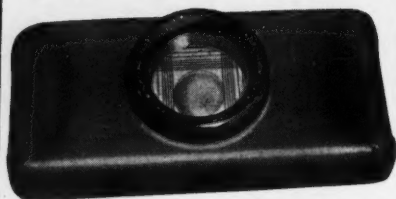
The new Grid Unit Heaters will give you years and years of dependable service, the same as the aluminum heating sections Grid Units—and many of these units now 14 years old are operating as efficiently as the first year. Ask for details now.

**D. J. MURRAY MFG. CO.**

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Established 1883. Offices in All Principal Cities

## "All-Way" LEVEL



The FELL Precision Level is made to show the level of all ways at once. This eliminates disturbing the first level when leveling the second. Graduations are in .0005" per foot and form squares about a circular bubble, thus giving co-ordinate readings and showing direction and amount of slope, if any.

MADE IN TWO SIZES

5 1/2" x 12"

3 1/2" x 6"

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## DANLY KWIK-KLAMPS TOGGLE CLAMPS FOR QUICK, POSITIVE CLAMPING IN ANY

POSITION  
WITH  
STANDARD HALF TURN



OR  
STRAIGHT  
CLAMPING BAR



**DANLY MACHINE SPECIALTIES, INC.**

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**DANLY** DIE SETS and DIE  
MAKERS' SUPPLIES

a third swivel for easy maneuvering, and a retaining latch which releases horn instantly yet holds it firmly in place when not in use.

The Alfite 100-Lb. Carbon Dioxide Engine is recommended for fires in flammable liquids, alcohol storage, electrical machinery, and for other Class "B" and "C" fires. The engine is designed to smother a fire instantly by means of carbon dioxide gas which expands upon discharge to 450 times its stored volume. The gas is noncorrosive, nonpoisonous, and odorless.

## Acme Quality Industrial Finish Flash-Off No. 99

A welding material designed to produce seams which are spatter-free, to be known as Acme Quality Industrial Finish Flash-Off No. 99, is announced by the Acme White Lead & Color Works, Dept. FFS-30, 8250 St. Aubin Ave., Detroit, Michigan.

To use, the material is simply sprayed, brushed, or wiped along the seam to be joined and on immediately adjacent areas of the metal. Welding is then performed in the usual manner. The material is said to prevent chips and spatter from adhering to the metal being welded, thus eliminating the necessity of finish grinding or scraping weld after completion. Due to the fact that Flash-Off No. 99 is said to be a good conductor of electricity, the material also helps prevent the arc from breaking, the result being an unusually strong welded seam.

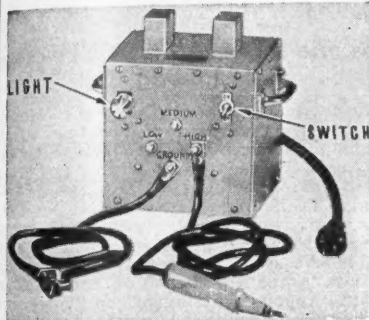
When it is desired to paint the welded object, Flash-Off No. 99 can be easily removed with a moist cloth or cold water. After drying completely, paint can be readily applied to the object, the finish thus produced being smooth, since Flash-Off No. 99 is said to prevent pitting of both galvanized and ungalvanized metals.

Acme Quality Industrial Finish Flash-Off No. 99 is available in 5-gallon cans or 55-gallon drums. The material can be reduced from 30 to 50 per cent with water.

## Westinghouse SA-174 Electric Drive Selector

A pocket-size slide-rule selector for electricians, plant maintenance men, and others interested in the selection of electric drive equipment, to be known as the Westinghouse SA-174 Electric

## IMPROVED RED-"E" ETCHER and DEMAGNETIZER for Stellite and Steel



Special alloy tip etches uniformly. Extra heavy cord and asbestos-covered wire assure safe operation. Air cooled handle. **SOLD ON 10 DAYS TRIAL.** Special production demagnetizers also made to order.

**GRINDING MACHINERY CO.**  
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## EVEREDE BORING BAR



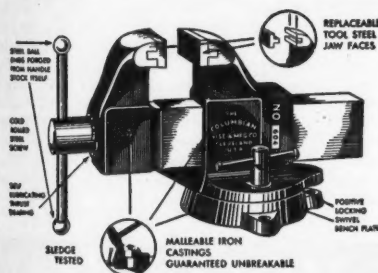
The **ONLY**  
Boring Bar with  
the economical  
triangular bit.

Designed to use a larger diameter bar than formerly used because the chip is cut in front to make room for the bar. This gives you rigidity, higher boring speeds and heavier cuts.

SEND FOR DESCRIPTIVE FOLDER  
Representatives in all principal cities.

**EVEREDE TOOL CO.**  
WILLIS STUTSON  
180 N. Wacker Drive Chicago, Ill.

# COLUMBIAN VISES



★ In addition to features shown in illustration, **Columbian Vises** are carefully machined to provide positive and accurate work on the most exacting jobs and also provide additional capacity to take care of the heaviest work. See your **Columbian Distributor**. He may be able to show you how you can step up bench work in your plant.

**THE COLUMBIAN VISE & MFG. CO.**  
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The World's Largest Makers of Vises

## FOR PROPER VISE CARE



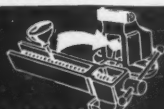
1. DON'T HAMMER  
ON HANDLE



2. DON'T HAMMER  
ON BEAM



3. DON'T USE  
HANDLE EXTENSION



4. DON'T  
FORGET TO OIL THE  
SCREW & NUT

Drive Selector, is announced by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. To aid in the selection of the proper type of motor for each of 44 industrial applications, a convenient table lists the various uses and indicates which of the four principal types of a.c. motor should be selected.

Information is obtained from the selector by setting the cardboard slide for the proper type motor and then reading its specifications through the window in the acetate envelope. Pertinent facts such as horsepower ratings, speeds, voltages, frequencies, and starting and

pull-out torques are thus obtained. The reverse side of the selector shows the various magnetic and manual controls available for each type of motor and lists the proper control number.

## Fostoria Model MF-240-N Fluorescent Lighting Unit

Announced herewith is the Model MF-240-N Fluorescent Lighting Unit which has been brought out by The Fostoria Pressed Steel Corp., Fostoria, Ohio. Equipped with a patented National Transformer Power Unit No. 990, the unit accommodates two 40-watt Mazda F lamps and turns them on and off in the same manner as incandescent Mazda lamps are turned on and off. The instantaneous starting of the fluorescent lamps is accomplished without starting switches, thus, switch replacement is eliminated.

The standard outside finish on the Model MF-240-N is Hammered Cloud Grey enamel baked by the Near Infra-Red Process—a finish which is said to be permanent and chip-proof. Optional finishes are Hammered tan and green, Wrinkle grey, brown, and black, and Gloss grey, green, ivory, and white. The standard reflecting surface is Fostoria Baked Matte-white enamel. Optional reflecting surface is gloss white baked enamel. Both surfaces are easily cleaned.

In addition to features already mentioned, other features of the Fostoria Model MF-240-N Fluorescent Lighting Unit include stabilized lamp life, high power factor—60 cycle, a.c., 110-120 volts—maximum lumens per watt, Underwriters' Laboratories approval, elimination of flicker and hum, adjustable bracket for directional lighting, and so on.

## DIAMONDS for Victory

**BIG-HEAD-NIBS  
LOC-KEY-SET  
RE-SET-ABLE**



Grinders instruction card free.

Cooler dressing  
Closer tolerances  
Micrometer Accuracy  
Because: Wing key  
heat dissipation  
and absolute diamond lock nib.

• Three grades of diamonds. Common quality \$12 per karat. Medium quality \$24 per karat. Select quality \$48 per karat. (Contour template diamonds supplied only in Medium and Select quality.)

All diamond sizes  $\frac{1}{4}$  to 10 karat are nib mounted for immediate shipment... Billed subject to approval. Specify quality of diamond wanted. We recommend a minimum size of one karat for each 6" diameter of grinding wheel. (24 hour resetting service, \$1.00 post paid.)

Send specifications and prints for prices on turning and boring form tools.

**DIAMOND TOOL COMPANY, Not Inc.**  
Sheldon M. Booth, Pres.  
934 E. 41st Street CHICAGO, ILL.

## EVANS HIGH SPEED STEEL REAMERS



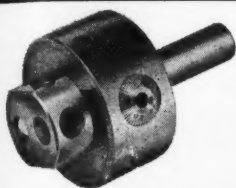
### LOOK AT THESE FEATURES

- No honing.
- Will not chatter.
- Chrome-like finish.
- Perfect alignment.
- Full bearing surface.
- Left and right spirals.
- 50 to 80 thousandths expansion.
- Cannot fall in slots or oil grooves.
- Extension pilots for line-up work.

**WILL SHIP ON  
30 DAYS' TRIAL**

**EVANS FLEXIBLE REAMER CORP.**  
4541 RAVENSWOOD AVE. CHICAGO, ILL.

**WRITE FOR  
CIRCULAR**



## Micrometer **FRAY** OFFSET BORING HEADS

Offsets  $\frac{1}{4}$ "—Head  $2\frac{1}{2}$ " overall.

Micrometer Dial 50 divisions—.001".

Three Tool Holes—one hole runs true with arbor.

All parts nickel-chromium steel, SAE 340.

Two  $\frac{1}{2}$ " Boring Bars fitted with H.S.

Tool Bits and Three Wrenches with each head.

### **FRAY MACHINE TOOL CO.**

503 W. WINDSOR GLENDALE, CALIF.

Manufacturers of "All Angle"  
Milling Machines and Attachments



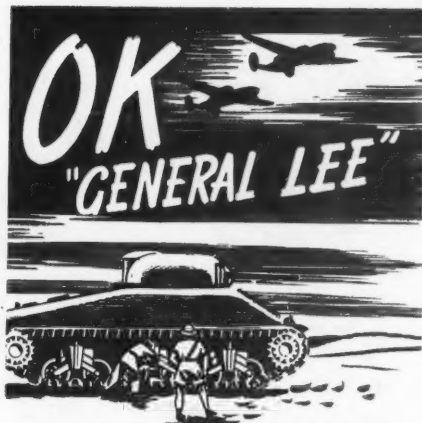
- ◀ Special Anti-Mushrooming  
Anti-Chipping Heat-Treat
- ◀ Oversize Shanks
- ◀ Exclusive Knurled Back
- ◀ Exclusive Thumb Grip
- ◀ Broach-Rounded Corners

**A Complete  
Engineering Service  
on Marking Devices**

Write for Price and Data  
Bulletin No. 113-12

**NEW METHOD STEEL STAMPS, Inc.**

149 Joseph Campau, Detroit

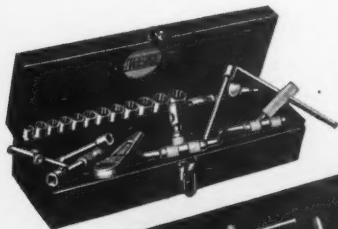


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America's armed might depends upon good tools . . . Walden Worcester is proud of its part in furnishing these.

Not only in the field, but also in the factory, Walden Worcester tools will help you win your production battles.

Send for catalog showing complete range of dependable sockets, wrenches, and tools . . . produced by a plant with over thirty-six years experience in building good tools.



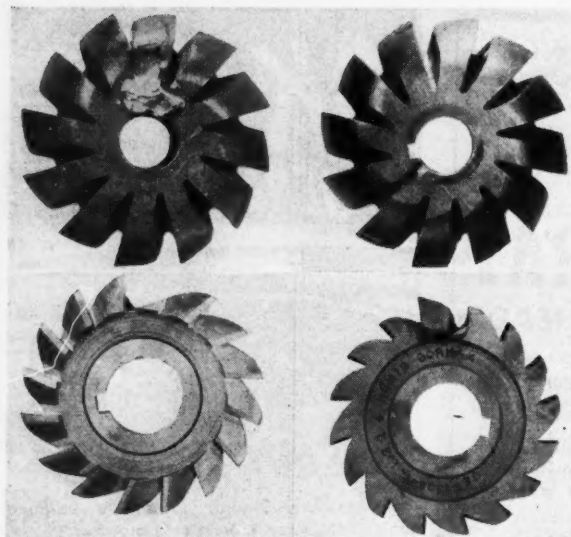
**STEVENS WALDEN, INC.**

473 SHREWSBURY STREET

WORCESTER, MASS.







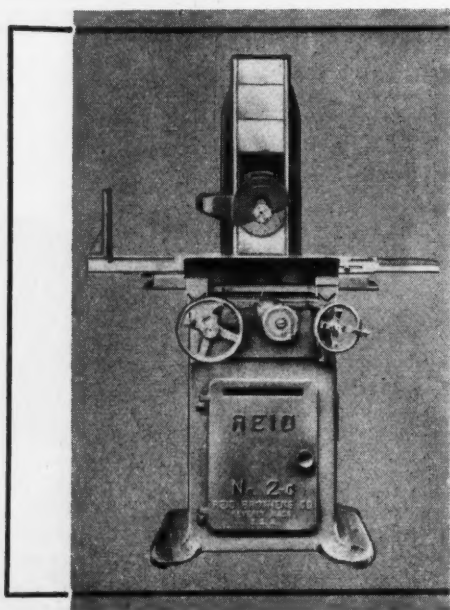
(Above) — Before and After Fractured Ball Milling Cutter was Repaired by "Suttonizing" and Refluted. Rough Ground, but Ready for Use (Below) — Before and After Milling Cutter Tooth was Replaced by "Suttonizing." Rough Ground

### "Suttonizing" Welding Process

Designated as "Suttonizing," a welding process for use in reclaiming or repairing teeth, flutes, tangs, shanks, and fractures on milling cutters, broaches,

drills, large size Ingersoll type ball and end mill, line reamers, cutting tools for lathes, planers, and shapers, and special shaped forming tools is now being marketed by the Welding Equipment & Supply Co., 223 Leis St., Detroit, Mich. Due to a system of ingenious preheating before welding, the subsequent heat treatment of units is, in most cases, said to be eliminated. In addition, with the process, annealing before reclaiming tools is also said to be eliminated.

By means of the Suttonizing Process, welds deposited become integral parts



## REID *Hand Feed* SURFACE GRINDER

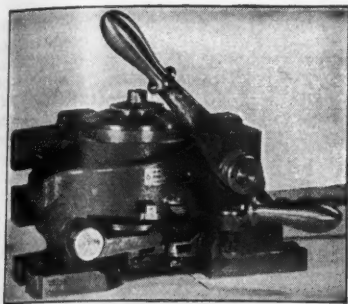
Head elevating hand wheel is beside table feed hand wheels for ease of operation without loss of motion.

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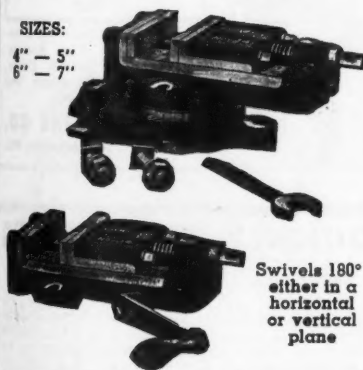
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SIZES:

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Swivels 180°  
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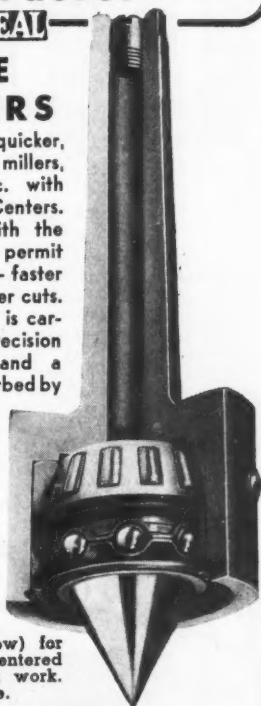
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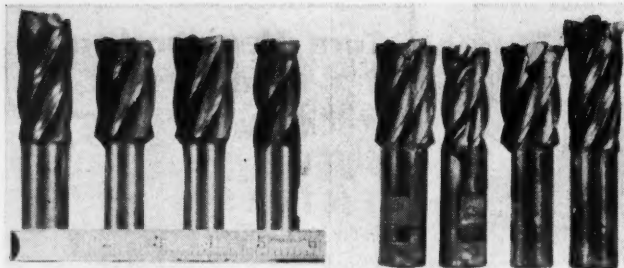
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Before and After Milling Cutter Tooth was Replaced by "Suttonizing." Rough Ground

of repaired tools, thus reducing the possibility of rebreakage to a minimum. The process provides a means for producing deposits which combine the cutting qualities of conventional high speed steel with the abrasive resistant qualities about equal to those of typical tungsten carbides, thus making grinding of deposits easy as well as giving deposits which are homogeneous and are said to match or excel the original hardness of the tool being welded.

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A powerful chemical powder which is said to effectively waterproof brick, stone, and stucco, to be known as DRYE, has been placed on the market by the Weather Seal Co., 16 E. Pearl St., Cincinnati, Ohio. Equally effective inside or outside, DRYE is designed to waterproof basements, walls before plas-

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of small parts.

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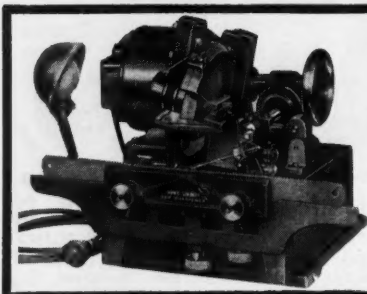
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Most modern Nibbler for Template Cutting, Tool Rooms, Shipbuilding, Aircraft Parts, Aircraft Tubing, Sheet and Plate Shops.

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WRITE FOR FOLDER.

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- T** is for the **TOUGH** alloy steel used to make them.  
**H** is for their **HARDNESS** — scientifically correct.  
**O** is for the **OLD AGE** which Thor Stamps reach in use.  
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High Carbon and High Speed Steel.  
 All sizes—all shapes. Write for catalog.



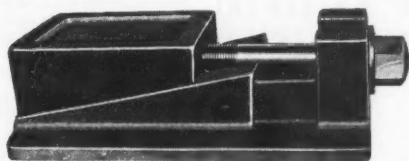
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ter is applied, motor joints, and so on. The material can also be used for hardening and waterproofing cement and mortar when included in the mix and for repairing cracks in concrete and iron and bonding tile to cement.

DRYE can be easily mixed with cold water to form a paste which may be readily brushed or troweled on the surface to be waterproofed. Only one application is required for outside work; two coatings if applied inside. Coverage is said to be approximately 10 square feet per pound.

If colorless waterproofing is desired, a companion product known as Liqui-

DRYE is available. This material is especially designed for porous types of masonry such as stucco and requires two applications.

### Southwest Pyralin-Tipped Mallet

Designed to prevent marring of metal or plated finishes, a mallet having Pyralin tips which are readily replaceable.



Southwest Pyralin-Tipped Mallet

is announced by the Southwest Mfg. Co., 1623 E. First St., Santa Ana, Cal. In addition to the Pyralin tips, features of the mallet include a solid brass head threaded at both ends to receive the tips, and a hardwood handle fitted into oval hole in head to prevent turning or loosening.

The Southwest Pyralin-Tipped Mallet is available in head sizes from 3/4 to 2 inches and with regular mallet type and cross and ball pein type Pyralin tips. Fiber and Micarta tips can be obtained on special order.

### Erratum

The Deepfreeze Santocel Metal Chilling Unit which was announced on page 250 of the September issue of this magazine is a product of Motor Products Corp., North Chicago, Illinois, instead of the firm to whom it was credited.

### New Nesting Type Tote Pans



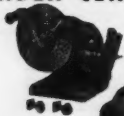
20" long x 12" wide x 6 1/2" deep.  
16 ga., drag holes and handles both ends.

**J. L. LUCAS & SON, INC.**

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### Vernon 6" UNIVERSAL INDEX CENTERS



Head swivels and locks from 10° below horizontal to 10° past perpendicular. Spindle taper #98&S. The 3 index plates provided will divide all numbers to 50 and all even numbers to 100 (except 96T).

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### Here's a Real Spring Winder!

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**WILL EARN ITS COST IN ONE DAY**  
The HJORTH Perfection Spring Winder offers the ideal means of winding extension, compression, torsion, taper, double taper, or left hand springs. Try one in your shop. You'll like it and the price is reasonable.

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for every industrial  
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**CIRCULAR  
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Also special saws.  
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type and holder make part  
number changes a simple  
operation. Turn a screw  
to make the change.

Guaranteed for years  
of service. Used by  
hand or press, it's a  
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## New Books

**Training Workers and Supervisors.** By Charles Reittel. Published by The Ronald Press Co., 15 E. 26th St., New York, N. Y. 182 pages. Semi-flexible covers, cloth binding. Price, \$1.50.

Of an unusually practical nature, the material of this book is based on specific experiences and problems solved in numerous plants. The book shows what has been accomplished by many companies in successfully meeting their needs for an expanded labor force of high quality and an adequate and competent supervising force. The plan of the book follows a line of attack which seeks a successful and enduring solution of vitally important problems by going to bedrock fundamentals of human nature and management experience.

In Part I are discussed principles and methods for selecting new employees. Job ratings, the use of application forms and procedures, the place of tests, and the techniques of interviewing are specifically treated.

Part II offers specific methods of training. This division of the book shows how to take advantage of the

two secrets of training success—the building of correct habits in performance of operations and the tested techniques of good teaching. With immediate defense demands everywhere for more trained workers, there is inevitably a call of exactly the same urgency for supervisors who are capable of teaching these hordes of new workers. This part of the book, therefore, is especially directed toward the training of trainers of the trainees.

Part III is concerned with the training that builds good standard performance, both as to quality and quantity production. The role of standards and their specific application to costs, quality and quantity, and planned operations is discussed in detail.

Part IV, Human Relations, is of prime importance. In this section are presented underlying factors in the relationships of management and labor whose basic importance must be recognized and faced.

**Labor Arbitration, Principles and Procedures.** By Dr. John A. Lapp. Published by the National Foremen's Institute, Deep River, Conn. 5 x 7 inches in size. Cloth binding. Price, \$3.50.

**Cushions HEAVY LOAD SHOCKS**



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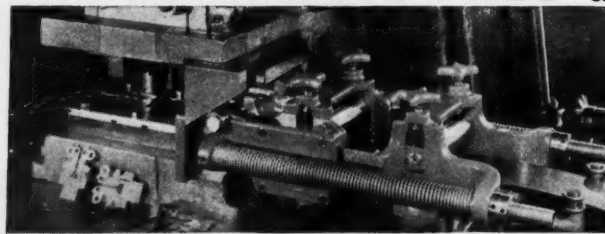
5/8" TO 16" ANY MATERIAL

**DETROIT BEVEL GEAR CO.**

Mfrs. of Quality Gears for 30 Years  
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FOR QUICK SET-UPS ON SHORT OR LONG RUNS



Handles coiled stock of any practical thickness. Maximum stock width 4". Adjustable from 0 to maximum feed length of 3" in increments of .001". Accurate.

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For Greater Drill-Press Output



Wherever a drill comes down, something must hold the work. Wherever a drilling-jig is required, Air-Clamp will simplify it. Wherever speed is desired, Air-Clamp will produce it. Air-Clamp holds with relentless pressure; is undisturbed by size variations (such as in castings), it scoffs at vibration (how many drills have been broken due to faulty hold-downs?), chatter, snagging. Air-Clamp holds work of any size or shape in any position, at any angle. It can pay for itself on a single fixture; it can save its cost on a few days' drill-press output. Reduces operator-fatigue. Saves hours and dollars in drafting room, jig department, tool room and production line. Air-Clamp fits any drill-press having a cylindrical column. Special fixtures for Tee-slotted tables, light milling work, etc. Hand and/or foot control. Shipped on approval to responsible concerns.

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## M-B SUPER-SPEED Pneumatic GRINDER

Model SS-SR



War Effort  
Calls for  
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Grinders. Write for  
**FREE TRIAL OFFER**

### A 100,000 R.P.M. Unit

The only hand grinder with spindle speed of 100,000 R. P. M. on 100 pounds air pressure. It has revolutionized hand grinder performance. Can be directed in any working position; operates with extreme ease. Steel construction throughout. Formed to fit the hand. Weighs only 14 ozs.

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This blade solved today's metal sawing problem



Victor Saw Works, Inc.,  
advertisement on front cover  
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Ten years ago VICTOR introduced the first molybdenum alloy hack saw blade bringing a tremendous saving in heavy duty metal sawing costs.

Today VICTOR "Moly"\* High Speed — better by far in steel, heat treatment and uniformity—is being adopted by war production plants everywhere—with no impairment of cutting efficiency.

When you buy power or hand blades for high speed work, be sure to specify VICTOR "Moly"\* High Speed — the original molybdenum alloy blade, unexcelled today. Look for the all-over gold metallic finish that identifies the genuine.

For awkward work, it's VICTOR Unbreakable Special Flexible — that cuts like an all hard, yet cannot be broken in use in a frame.

**VICTOR SAW WORKS, INC.**  
MIDDLETOWN, N. Y.



\*T. M. Reg.—introduced and made only by Victor Saw Works, Inc., and affiliated companies.

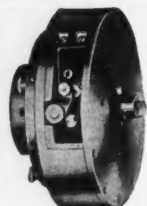
VICTOR MOLY HIGH SPEED

587

Said to be the first comprehensive work devoted exclusively to the subject of labor arbitration, this book has been written by a man who has an unusual wealth of experience and knowledge in matters relating to the subject. He was former Chairman of the Coal Labor Board II Division, member of the Petroleum Labor Policy Board, Head of Labor Relations for the Public Works Administration, Labor Advisor to the Rural Electrification Administration, Referee of Jurisdictional Disputes for the Building Trades, Referee National Railroad Adjustment Board, as well as arbitra-

tor in many important disputes on wages and working conditionings involving giant corporations and important unions.

The author begins with a concise exposition of the whole field of labor arbitration and description of the various types of labor cases and the laws pertaining to arbitration, and then goes on to provide a very detailed guide to the mechanics of conducting arbitration. His chapters on the Arbitration Tribunal, the Organization of an Arbitration, Procedures, Preparing the Case. The Award, are said to leave no detail uncovered. The book also includes an appendix containing actual examples of arbitration agreements.



## M-D Facing Heads

### With Automatic Feed

Can be attached to Boring Mill Bar, and Drilling or Milling Machine spindles. Single point tool travels radially, from center outward or reverse, feeds automatically. Sizes 6" to 46" diameter.

Write for circular.

**MUMMERT-DIXON CO.**

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## Vernon 7" ROTARY TABLE



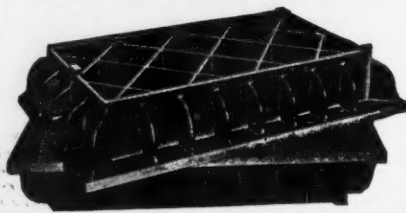
Precision ground top and bottom—Substantially ribbed. 4 table quadrants calibrated 0 to 90° each. Friction loaded worm dial graduated in 240 minutes. Overall height only 2 3/4". Write for folder!



**BL Cold Finished Bar Steels.** In commemoration of its 50th anniversary, Bliss & Laughlin, Inc., Harvey, Ill., has published a special 240-page book on BL Cold Finished Bar Steels. Designed to help users of steel in general and dedicated to the customers of the company, the book is provided with flexible imitation leather covers and is available at a price of \$2.00 per copy.

Contents of the book are as follows: Chapter I, the History of Bliss & Laughlin, Inc.; Chapter II, The Production of Cold Finished Bar Steels—(A) Cold Drawn Steels, (B) Turned and Polished Steels, (C) Ground Bar Steels, (D) Function of Laboratory and Inspection Departments, (E) Bar Making, (F) Packaging and Shipping; Chapter III, Technical Section—(A) Glossary of Terms, (B) Grain Size and Charts, (C) Machinability of Cold Finished Steels, Plain Carbon Steels, Bessemer Steels, Open Hearth Steels, and Alloy Steels, (D) Furnace Treatment of Steels—Strain Tempering, Normalizing, Annealing, Simple Heat Treating, Carburizing, Liquid Hardening, Nitriding, Special Surface Hardening, (E) Application of Cold Finished Steel to Industrial Pur-

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Accuracy guaranteed on 12" x 18" size within .0005". On 36" x 72" within .0015". Thoroughly normalized and weather seasoned Reid Precision-Planed Surface Plates have proved thoroughly satisfactory on work to close limits.

Excellent delivery—Write for prices—details.

**Tool Engineering Service Co., Inc.**  
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One of numerous cartridge clips produced complete per stroke on Dieing Machines, the above is for caliber .303 rifle turned out at record-breaking high production.

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For several years before Pearl Harbor, the unique Dieing Machine was turning out munitions stampings at record-breaking rates. Today they are called upon to produce the vast majority of machine gun belt links, as well as a wide and growing variety of parts and operations vital to the war effort. Replacing 5 to 10 conventional presses, the Dieing Machine produces the most intricate parts, complete per stroke, to precision of .0002" when required, at speeds up to 600 s. p. m., with capacities from 10 tons to 300 tons. Counsel based upon our wide experience is yours for the asking: cheerfully and promptly!

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# HENRY & WRIGHT DIEING MACHINES



Machine gun belt link produced complete one per stroke to extreme precision limits at exceptionally high speed.



INCLUDING BROACHING

Airplane fuselage hinge of duralumin produced complete per stroke on the Dieing Machine in continuous strip to high precision limits.



Airplane strut seat of .031" brass produced complete one per stroke at new high rate.

494 WINDSOR ST.  
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# The Last Word . . .

WESSER'S cartoon, elsewhere in this number, seems to us to be particularly apt at the moment, in that it expresses the growing impatience of the American public with the irresponsible hot-heads who are jeopardizing the safety of the nation—including themselves and their own families and homes—by stopping or slowing down work on defense materiel.

As we go to press, 10,000 shipyard workers in the South are striking over the payment of a five-cent ferry fare. Whether or not the five-cent fare is justified is a matter that could easily have been settled by responsible representatives of the factions involved; the important point is that, for a matter of ten cents a day at a time when wages are the highest they have ever been, these men will hold up production on vessels that are badly needed for the transportation of supplies. And not only have they stopped production in this critical hour, but by so doing they have violated their own pledges "to refrain from striking for any reason for the duration of hostilities."

In one of Akron's big rubber plants there have been three "wildcat" strikes since Pearl Harbor and, according to men connected with that plant, production is geared to the pace of the slowest workers. The report is that any worker who attempts to turn out a normal day's work is in danger of physical violence.

And Akron isn't the only city where the war effort is being sabotaged by short-sighted and irresponsible workers. Reports from the Detroit front indicate that the workers in many Detroit war production plants are systematically slowing down and "stringing out" the work. In some plants production schedules are said to be a joke.

These are only a few of the many strikes and slow-downs that have occurred since Pearl Harbor—every one of which is aiding the enemy just as much as though these strikers and work-slowers were in Hitler's pay.

To the credit of the Union heads it must be said, however, that they have tried to prevent these strikes; they realize the seriousness of the situation and have urged their members to stay on the job, but in many cases their pleas have been ignored and irresponsible counsel has prevailed.

Labor Unions have a very definite place and function, and they have done a lot of good. But the structures they have builded are being sabotaged and public sympathy with the Unions is being undermined by the very men for whom these organizations were built up. What is worse—they are failing the thousands of American boys who are fighting for the liberty of all of us—including the strikers—and who are depending on us for guns and ammunition and supplies.

*And if our lines should sag and break  
Because of things you failed to make;  
That extra tank, that ship, that plane  
For which we waited all in vain;  
Will you then come to take the blame?  
For we, not you, must pay the cost  
Of battles you — not we — have lost.*

(Written by a soldier on Bataan.)

*Howard Campbell*

THE J & tershaft, connecti it into th It is of th and can volt alte deep, 6'

J. 202 Rich

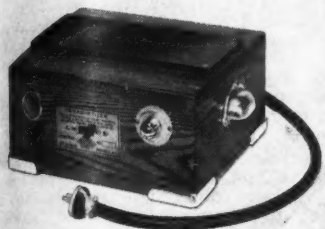
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from Quickly face or GE mot size Fil air to dreds n standar

AGE 2046 BO

October





## THE J & H DEMAGNETIZER

### FOR ALTERNATING CURRENT

The J & H Demagnetizer requires no countershaft, belts, or other intricate electrical connections. All that is necessary is to plug it into the nearest lamp socket or receptacle. It is of the new Unipole type—heavy duty—and can be supplied for either 110 or 220 volt alternating current. Size 12" long, 9" deep, 6" high. Weight 60 lbs.

Sold on One Week's Trial

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202 Richmond Street, Providence, R. I.

**STOP**



**DUST!**

## from Grinders with DUSTKOP

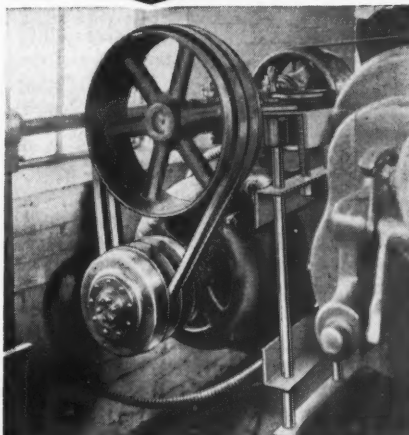
Quickly attached to any tool, cutter, surface or internal grinder... Operated by GE motor and fan... Spun-glass Over-size Filter stops dust and returns cleaned air to room... **LOW PRICED**... Hundreds now in use. Prompt deliveries on standard units with high priorities.

Write for Bulletin A-500.

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**INFINITE VARIABLE SPEEDS  
WITH CONSTANT SPEED MOTORS**

with  
**HI-LO**  
**AUTOMATIC  
PULLEYS**



HI-LO Pulleys maintain constant speed at any set point and automatically regulate belt tension to load. Load is carried by cams which ride on tracks in end bells. Springs keep pulley faces up against belt at all times.

HI-LO Pulleys are easily installed on any machine and will handle drives from fractional up to 5 h.p.

Write for folder which gives sizes and prices and formulae for determining proper size pulleys.

**EQUIPMENT ENGINEERING CO.**

2853 COLUMBUS, MINNEAPOLIS, MINN.



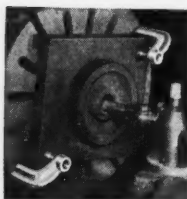
South America will welcome this book because of its usefulness. The book covers a very large number of words pertinent to shipping and international trade. It also contains conversion tables of weights and measures and monies alongside of the literal translations.

**Steel Handbook No. 42 for Machine Tool Users.** Union Drawn Steel Division, Republic Steel Corp., Massillon, Ohio, announces the publication of a war-time edition of its Steel Handbook

for Machine Tool Users. A timely feature of the book, which is designated as the No. 42, is the incorporation of the combined standard steel lists of the American Iron and Steel Institute and the Society of Automotive Engineers Inc., for carbon and alloy steel bars with suggested speeds and feeds for machining many of these grades with standard tools on automatic screw machines.

Another feature of the book is a 12-page section describing and illustrating the various cold finishing processes and giving tolerances, size ranges, standard lengths, and other information on the various types of cold finished steel. In addition, the book contains many tables giving revolutions per minute of spindles at given surface speeds for work of various diameters, drill sizes and lengths of points, allowances and tolerances for screws and nuts, thread elements and tap drill sizes, physical properties, weights, wire gauges, information on tool grinding and heat treating, decimal and metric conversion tables, stock estimating tables, and hardness conversion tables.

Designed for easy fitting into a pocket, the Steel Handbook No. 42 contains 100 pages and is mechanically bound and thumb-indexed for easy reference. Copies free of charge to executives who address their requests on their company letterheads, mentioning their titles.



### Cut Set-Up Time

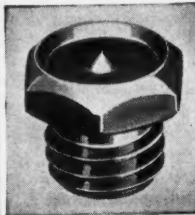
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**New Advance Clamps**  
(the only T-slot clamps)  
Clamp directly over  
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Standard and Heavy-Duty type.

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Simply insert in holes,  
invert, strike sharply and  
you have centers and drill  
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Reduce time and eliminate  
spoilage of other methods.  
7 sizes U.S.S. Inexpensive  
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### Trade Literature

**Screw Products Catalogs.** Manufacturers Screw Products, 294L W. Hubbard St., Chicago, Ill., is now publishing a 96-page screw products catalog in which all items conform to the revised suggested stock size lists as per the maximum price regulation No. 147 of the



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### CURVE TOOTH CUTTERS

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### Enjoy the Advantages:

More cutting edge Gives shearing cut  
Cuts 50% faster Easy to sharpen  
More cuts per sharpening

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The HAMILTON  
MUEHLMATT  
Super Sensitive  
DRILLING MACHINE

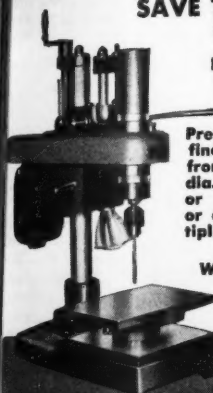
SMALL DRILLS

are too  
precious to  
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SAVE THEM . . .  
Use this  
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Precision - built for  
finest work. For holes  
from .004 to 5/16  
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or arranged in mul-  
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Are especially  
desirable for  
producing clean  
cut, accurate  
parts with com-  
pound dies. For  
after operations,  
swaging,  
piercing, trim-  
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preferred.



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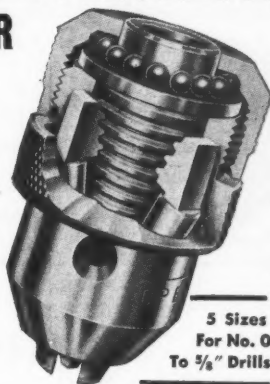
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## KEYLESS DRILL CHUCKS

Drilling goes faster because these chucks eliminate key tightening — a non-productive operation that wastes much time and energy in the course of a day's drilling. Drilling action does the tightening and the heavier the load the tighter the chucks hold. This also eliminates slippage and retightening. In addition to this important "KEYLESS" advantage, Ettco-Emrick Drill Chucks are built of best materials and their design minimizes wear. They're good for long, continuous service. There are none better.



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To 3/4" Drills

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MAKERS

OF *Ettco-Emrick* DRILL CHUCKS • TAP CHUCKS • TAPPING ATTACHMENTS  
MULTIPLE TAPPING AND DRILLING HEADS • TAPPING MACHINES

Office of Price Administration dated May 23, 1942. Sectionalized for easy reference, the catalog contains not only list prices but also complete technical data, including weights and dimensions of various products.

Copy of the catalog will be sent free of charge to any engineer or purchasing agent requesting it on his company letterhead.

**Watson-Stillman Forged Steel Fittings.** Designated as the A-3, a 44-page attractively printed bulletin illustrating and describing 166 different kinds of forged steel fittings for high pressure high temperature service has been published by the Distributor Products Division of The Watson-Stillman Co., Roselle, N. J. To render it as convenient as possible to the reader, the bulletin is divided into three sections.

Section 1 includes 33 illustrations of forged steel screw fittings together with descriptive information as to type of unit, use, pressure ratings, dimensions and list prices of each item as furnished in carbon steel, carbon-molybdenum steel, chromium-molybdenum steel, or stainless steel. Section 2 performs the

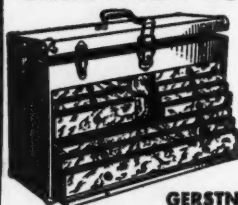
same function for forged steel socket welding fittings.

Section 3 includes engineering data vital to the user of fittings. It contains excerpts from the piping code, methods of calculating wall thickness and stress specifications, pressure - temperature charts, standard pipe thread dimension tables, methods of calculating fillet welds, and steel pipe data.

Copy of Bulletin A-3 will be sent free of charge to anyone requesting it on his company letterhead.

**"Firthite" Tools.** Complete information on "Firthite" Sintered Carbide Tools and Tips, standard and special, is contained in a 40-page catalog released by the Firth-Sterling Steel Co., McKeesport, Pa. The catalog treats various styles of turning tools, center straight flute drills, spear-point drills, prismatic drills, cut-off tools, masonry drills, wear-resisting parts, and so on. Complete prices on these tools as well as standard and non-standard "Firthite" tips are given in a separate catalog. Copies of both catalogs can be obtained free upon request.

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are favorites with toolmakers and machinists who want the best designed and most serviceable chests.

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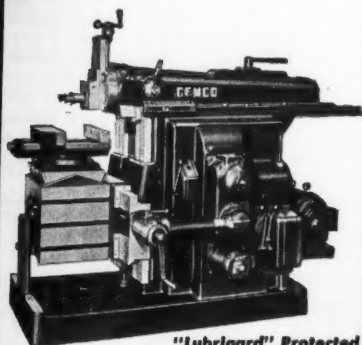
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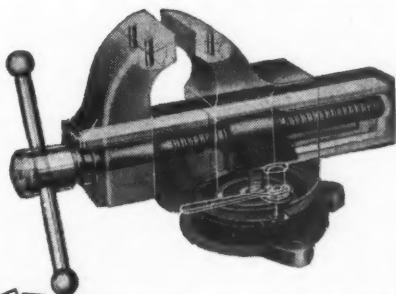


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General Engineering & Mfg. Co.  
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# A SUGGESTION



that may **HELP YOU**  
**GET VISES FASTER**

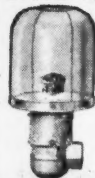
• Most of the orders pouring in for Parker Vises call for the most popular models. This means that some customers, even with high priorities, have to wait, in spite of our unprecedented production efforts. We suggest that you designate a second and third choice of models when you order. There's a chance that the alternates may be available for earlier delivery. Remember that *all* Parker Vises are quality vises. Look over the catalog and see what other models will serve your purpose as well as your first choice. And remember to specify **END USE!** The Charles Parker Company, Meriden, Conn.

**PARKER VISES**  
**AMERICA'S OLDEST**

**"The Care and Operation of a Lathe,"** a 108-page pocket-size paper-covered manual for the apprentice or student machinist, has been published by the Sheldon Machine Co., Inc., 4250 N. Knox Ave., Chicago, Ill. The manual illustrates and describes the modern back-gear screw-cutting lathe, its parts and their functions, oiling and proper care of a lathe, the grinding of cutters, modern lathe tools, holding of work, and the performance of basic lathe operations. Copies of manual can be obtained at a price of 50 cents each.

## TRICO OILERS

**SAVE TIME — OIL — WORRY**



No guesswork—bearing failures—waste—idle machine time—oil-soaked motor windings—fire and accident hazards, when you modernize with **TRICO OILERS**. There's a type for every application.

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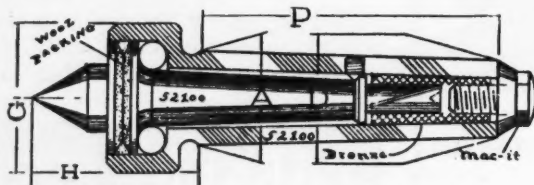
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SPECIAL TOOLS**



**PUNCHES and DIES** for round, square and other shaped holes.

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**RIGID TOOL CO. • 2010 Witherell St., Detroit, Michigan**

**Cincinnati Hypro Vertical Boring and Turning Mills.** Bulletin No. 175 covering the construction, operation, features and so on, of Cincinnati Hypro Vertical Boring and Turning Mills, 8, 10, and 12-foot types and 12-16-foot extension type is announced by The Cincinnati Planing Co., Cincinnati, Ohio. Copy of this 16-page profusely illustrated bulletin may be obtained upon request.

**"Keep 'Em Rolling."** An attractive booklet describing the highlights of the 25-minute motion picture, "Keep 'Em Rolling," showing the importance of rubber in the nation's war effort has been published by The B. F. Goodrich Co., Akron, Ohio, and is now available upon request. The booklet contains three self-addressed requests cards for the use of the film which may be obtained for showing before any organized group.

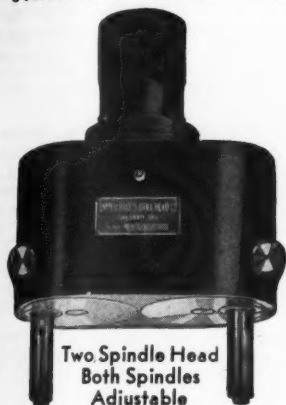
**"How to Cut Screw Threads in the Lathe,"** a 21-page bulletin covering the cutting of screw threads on back-gear screw-cutting lathes has been published by South Bend Lathe Works. The first part of the bulletin is devoted to the setting up of a lathe for thread cutting. Complete information is given on the various types of lathe tools employed in cutting screw threads, how to grind them, and how they should be mounted and positioned. The uses of the center gage, compound rest, thread-cutting stop, thread dial indicator, taps, dies, and so on, are explained. Types of screw threads commonly used are fully described and formulas and diagrams of standard screw thread forms are given.

Copies of Bulletin No. 36-A are available at 10 cents each, postpaid. Address: South Bend Lathe Works, Dept. 42, South Bend, Indiana.

If it is easier to roll a heavy barrel than to drag it, the **LIVE CENTER** is a positive **ECONOMY**.

## U. S. HEADS

STANDARD SINCE 1915



Two Spindle Head  
Both Spindles  
Adjustable

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*for Uniform Seating of  
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No need for skilled labor ...  
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when Whitney Milling Cutters are used for seating Whitney Keys. Cutters are made in all sizes to correspond with the keys which can't roll over. Complete information in Catalog V-111. Write.

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MARQUETTE MFG. CO., INC. • Minneapolis, Minn.



**Haskins "Highspeed" Tapping Machines.** A revised catalog on Haskins "Highspeed" Tapping Machines is announced by the R. G. Haskins Co., 620 S. California Ave., Chicago, Ill. In addition to complete up-to-date information on tapping machines, the catalog includes data on holding fixtures for Haskins Tapping Machines. Copy free upon request.

**Lincoln Arc Welding Inspection Chart.** An arc welding inspection chart especially designed for use by welding inspectors and others concerned with weld production is announced by The Lincoln Electric Co., Cleveland, Ohio. The chart illustrates very graphically the different types of welds obtained when the work is performed with normal current, voltage, and speed as compared with those obtained when these factors are not normal.

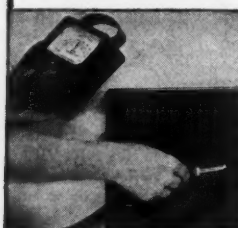
Accompanying the comparison photographs is a table indicating the burn-off of the electrode, the penetration of fusion, the appearance of the bead, and the sound of the arc with each value of current, voltage, and speed of welding. The chart also illustrates the use of the "Fleet-Fillet" technique of welding developed by The Lincoln Elec-

tric Co., which is said to nearly double normal welding speed. It also shows how the speed of welding increases as the size of the electrode increases. Copy of chart free to welding inspectors and others concerned with welding upon request.

**Werner Extruded Plastics Booklet.** 16-page booklet containing complete information on extruded industrial plastics and their use in war production has been prepared by the R. D. Werner Co. Inc., 380 2nd Ave., New York, N. Y. Copy free upon request.

**Steber Uti-Lite Adjustable Lighting Units** are described and illustrated in four-page bulletin issued by the Steber Mfg. Co., 2451 N. Sacramento Ave., Chicago, Ill. Uti-Lites shown include models for mounting on bench, wall, or pole and models with sturdy portable stands, both types being available for standard lamps as well as fluorescent lamps of various wattage capacities. Copy of Bulletin 108 free upon request.

## "ALNOR" Velometer



**An All Purpose Air Velocity Meter—Instantaneous, Direct Reading.**

Measures total and static pressures as well as velocities.

Write for catalog.

**ILLINOIS Testing Laboratories, Inc.**

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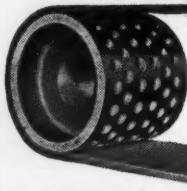


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**By a Quick, Easy, Inexpensive Method**  
Your business letterhead will bring literature.

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**30 Day Free Trial Offer.**

Stock most Std. Sizes to 16" Dia.  
Supply sizes 2" to 72" Dia.

**Shut Off Expense Caused by Slippage**  
**You Save Money on Every Installation**

**NEW LOW PRICED PRODUCTION LINE**  
**SEE PART LIST**  
**Prices Below**

Dia.	Face Price
2" x 2 1/2"	\$1.25
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4" x 3 1/2"	\$2.85
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**We Supply Fractional Dia. and Face Pulleys—From Large Casting Stock.**

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**Increase your Production**

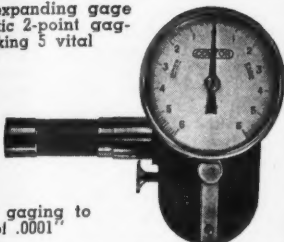
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Internal expanding gage  
—automatic 2-point gag-  
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Sizes:

1/4" to 7"  
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Automatic gaging to  
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Comtorplug offers utmost simplicity and accuracy in gaging bores to fractions of .0001". Operated successfully by inexperienced hands, its unfailing accuracy automatically provides 2-point gaging, showing ACTUAL SIZE of diameter, as well as revealing such irregularities as out-of-round, front or back taper, barrel shape, bell mouth. For MAXIMUM production, give Comtorplug to machine operators, as well as inspectors.

Request Bulletin 27

**THE COMTOR CO.**

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## Ten years' test makes Star best



● STAR "Moly"\* High Speed—the first molybdenum alloy hack saw blade—the only genuine "Moly"\*—is the result of ten years' testing by thousands of plants on heavy-duty metal sawing—the result of ten years' improvement in steel, heat treatment and uniformity.

Because of this head start, today's STAR "Moly"\* High Speed is unexcelled for swift sawing and long life. For high speed sawing—hand or power—demand STAR "Moly"\* High Speed. Look for its all-over copper metallic finish.

### INEXPERIENCED WORKERS CAN'T BREAK



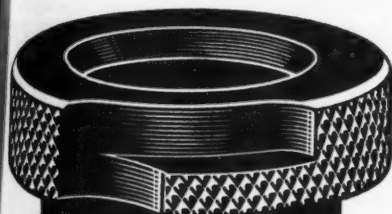
STAR Unbreakable Special Flexible in use in a frame. Yet this blade cuts and lasts like an all hard, speeding sawing and reducing blade-changing time. All-over green metallic finish.

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Incorporated

MIDDLETOWN, NEW YORK

\*T. M. Reg. — introduced, and made only by  
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Sheets and Prices . . .

**COLONIAL BUSHINGS, Inc.**  
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## COLONIAL DRILL JIG BUSHINGS

"Today — Ordnance Grinding, Tomorrow — Roll Grinding" is the title of a six-page folder released by the Norton Company, Worcester, Mass., covering the Norton 36-Inch Heavy Ordnance Grinder. Copy free upon request.

Euclid Crane and Hoist Circulars. The Euclid Crane & Hoist Co., Euclid, Ohio, is now issuing a series of four circulars containing brief but informative material on various Euclid Cranes and Hoists and their installations. Copies free.




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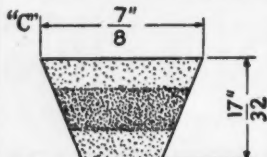
## CENTERLESS GRINDING

ACCURACY — PROMPT SERVICE

### Commercial Centerless Grinding Co.

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## The New Type CONTINUOUS LENGTH V LEATHER BELTING with the CLARK BALL BEARING FASTENER



The HEAVY oak tanned MIDDLE PLY does all the PULLING (The ball rides in the middle ply).

The OUTSIDE soft leather PLIES do the GRIPPING.

**WATERPROOF — OIL - RESISTING — LONG - LIVED.**

Made in A, B, C, and D sizes.

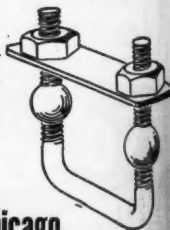
**Victor R. Clark Belting Co., 605 W. Washington Blvd., Chicago.**

**Amsco Dieweld Welding Rods** Electrodes for salvaging dies and production of composite dies, and die alterations are treated in a page illustrated bulletin issued by the American Manganese Steel Division of The American Brake Shoe & Foundry Co., 389 E. 14th St., Chicago Heights, Ill. Copy of Bulletin No. 742W free upon request.

**Western Transmission Insert.** A two-page insert for its transmission catalog has been released by the Western Mfg. Co., 3402 Scotten Ave., Detroit, Mich. The insert illustrates installations of Western Transmissions on a number of "hard-to-motorize" cone-driven machine tools such as automatics, boring mills, slotters, vertical turret lathes, thread millers, and so on. Copy free upon request.

**Elastic Stop Nut Wall Chart.** A wall chart explaining the uses of its various types of self-locking nuts is now available for free distribution to engineering departments, drafting rooms, maintenance shops, and schools by the Elastic Stop Nut Corp., 2327 Vauxhall Rd., Union, N. J. The chart measures 21 by 27 inches and is reinforced at the top and bottom by metal strips. An eyelet is provided at the top of the chart for hanging purposes.

The center of the chart is devoted to an illustrated description of the basic principle by which a self-locking action is obtained with all Elastic Stop Nuts regardless of type. This is followed by illustrations of some of the advantages to be obtained by the use of the nuts. Completing the presentation are cross-section drawings showing the method of application of the nine types of nuts most generally used together with corresponding photographs of each type.



## How to Speed Up Tapping and Reaming

**THE Ziegler Tool Holder,** by automatically compensating for spindle misalignment, greatly reduces set-up time—and also reduces spoilage losses due to over-size or bell-mouthed holes. Takes any and all end thrusts. Always floats freely. No friction or cramping, even under the severest tool-driving strains. No wonder it's the favorite in leading shops throughout the nation.

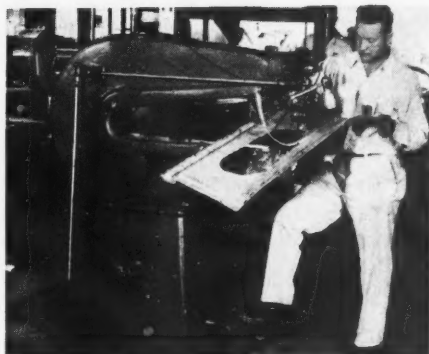


**W. M. ZIEGLER TOOL CO.**  
1920 12th St., Detroit, Mich.



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**FLOATING HOLDER**  
for Taps and Reamers...



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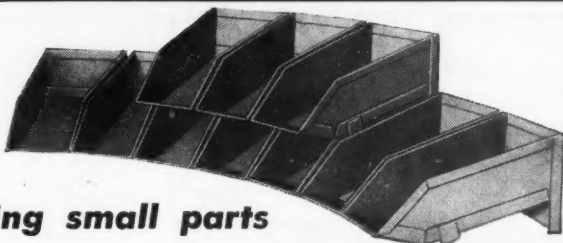
Built to speed up Aircraft Sheet Metal production, this Shear handles formed or flat pieces, internal or external cuts, plain or irregular shapes—quickly and easily. Accurately Operated by Unskilled Workers! You reduce labor cost with a Libert! Unskilled workers become experienced operators quickly—easily follow scribed layouts to produce perfect work. Libert Foot Pedal Control frees both hands for faster, more accurate work.

**LIBERT MACHINE COMPANY**  
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Bulletins on Request

Quality Shears Since 1915

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### for assembling small parts

Floors slope to feed parts to front — end reaching and fumbling.

All-welded construction.  
Rolled, smooth edges.

Bins taper toward front to form convenient semi-circle — keep all bins within easy reach.

Nesting, locking construction for rigid set-ups, easily changed when necessary.

Two sizes—tapered or straight edges.  
Hoppers available for steady work.

Write Stackbin Corporation, 53 Troy St., Providence, R. I., for further details and low prices.

# STACKBIN



# SYSTEM

"Stacked and

Still Accessible"

**STACKBIN CORP., Providence, R. I.**

**Allegheny Ludlum Blue Sheets.** Allegheny Ludlum Steel Corp., Pittsburgh, Pa., now has available a series of Blue Sheets on the analyses and properties of its various high speed steels, die steels, tool steels, and nitriding steels. Copies of Blue Sheets free upon request.

**"Gusher" Coolant Pumps.** The Ruthman Machinery Co., 1817 Reading Rd., Cincinnati, Ohio, is now distributing an eight-page bulletin describing and illustrating its line of "Gusher" Coolant Pumps, which are available in various sizes ranging from 1/30 to 2 h.p. The line includes immersed types, flange mounted types, pipe connected types, tank units, and plain drive types. Copy of bulletin free upon request.

**"The American Line."** A revised edition of "The American Line," a 12-page reference catalog on the entire line of products manufactured by the American Foundry Equipment Co., 555 S. Byrkit St., Mishawaka, Ind., has been released by this firm. This profusely illustrated catalog presents a complete summary of each of the following American prod-

ucts: Wheelabrator airless blast cleaning equipment — Tumblasts, Tablaster special cabinets, and the new portable Wheelabrator; Dustube cloth bag type dust collectors; high efficiency Cyclone dust collectors; wet disposal unit for dry tube dust collectors; sandcutters sand blast equipment; rod straighteners, and the American-Heanium Long Lyfe blast nozzle. Also included are illustrations of typical installations of these products in leading industrial plants, and a section containing a brief description of the mechanics, applications, and advantages of the airless Wheelabrator method of abrasive blast cleaning. Copy of Catalog No. 40 free upon request.

**"Increasing Production with Spot Welders"** is the title of a 12-page catalog issued by the Pier Equipment Mfg. Co., 900-20 Cross St., Benton Harbor, Mich., covering its Ace Spot Welders. The catalog describes and illustrates the essential elements comprising these welders, the various types of welders available, and their applications. The catalog also illustrates and describes a new Type 47 automatic weld timer for use with any size manually operated Ace Welder. Copy of Catalog No. 41 free upon request.

## GEARED FOR VICTORY

**BEVEL — HELICAL  
SPUR — WORM**



**THE TAYLOR MACHINE CO.**  
1917 EAST 61st ST.  
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**"TAYLOR - MADE"**

## WET GRINDING FINISHES

**Greatly Improved with GRIND-ALL**

Grind-All is a Concentrate used one Quart Grind-All with 30 Gallons your present grinding fluid. Immediately miscible with your present solution.

**MUCH FINER DEGREE OF FINISH IS GUARANTEED.** Less shut down wheel dressings.

Order thru your Mill or Industrial Supply Jobber, and if unobtainable, send order or inquiry to

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617 S. Beacon, Dallas, Texas - - - - 3221 S. Figueroa, Los Angeles, Calif.

**Westinghouse Fluorescent Luminaires** employing 40-watt, 48-inch lamps for use in lighting areas in industrial plants are described in a two-page leaflet announced by the Westinghouse Electric & Mfg. Co. The various parts comprising the luminaires are fully covered and the methods of mounting and wiring are discussed and the finish of the reflectors and accessories for the luminaires are also described. A construction outline

## The BARNES Motor Driven Precision CUTTER GRINDING MACHINE

For Precision Grinding of Formed Milling Cutters used in the manufacture of rifles, pistols, etc.



**GENERAL MACHINERY CORP.**  
140 Federal St., Boston, Mass.  
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PRESSES  
FEEDS  
AUTOMATIC  
EQUIPMENT

**THE V & O Press Co., Inc.**  
HUDSON, N. Y.

## Remove BROKEN TAPS

### Quickly

Insert WALTON Tap Extractor and back out broken piece. No annealing—no drilling.

### Easily

Tap Extractor and Tap Wrench are only tools needed.

### Safely

Threads are not damaged. Not necessary to tap oversize after broken tap is removed.

**The Walton Co.**

99 ALLYN STREET  
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You can save time, increase tool life and improve tooled surface finishes by preparing your soluble coolants and cutting compounds with a "LIGHTNIN" Mixer.

Whether you "make-up" for individual machines or have a central circulating or cooling system, a "LIGHTNIN" of the proper size and capacity is available to solve this problem for you. "LIGHTNIN" MIXERS CAN BE READILY CLAMPED ONTO ANY TANK OR VESSEL. They have been successfully used in large plants for mixing cutting oils for over twenty years!

Write for a catalog of "LIGHTNIN" Mixers. State the size of tank or tanks you use and the current available. Complete details will gladly be furnished.

**MIXING EQUIPMENT CO., INC.**

1048 GARSON AVE., ROCHESTER, N. Y.



gives physical dimensions, and a graph shows typical distribution curves of a fluorescent luminaire.

Two tabulations are shown, one giving lamp wattage, circuit volts, and prices for two and three-lamp units, the other giving installation data for the two units. Mounting height, spacing, room proportions, and average footcandles are listed.

Copy of Catalog Section 61-152 may be obtained from Dept. 7-N-20, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pennsylvania.

**"How to Boost Production Through Increased Employee Morale,"** a manual for business executives and plant managers, has been prepared by the Labor Relations Institute. The manual details practical method for organizing management-labor committees as a means of obtaining greater output. It also tells how to formulate and administer suggestion systems and effective grievance machinery, and includes practical pointers on how to enlist union and employee cooperation in plans for speeding production.

Discussed too are effective uses of

posters, bulletin boards, loudspeaker systems, and production score boards. In addition, the manual contains a check list of 15 industrial "morale killers" which retard production and lower employee morale.

Copy of manual may be obtained by writing to Lawrence Stessin, Industrial Division, Labor Relations Institute, 170 Broadway, New York, New York.

**Walker-Turner "1100" Series Drill Presses.** A six-page folder containing illustrated, descriptive, and tabular on Walker-Turner "1100" Series 20-Inch Drill Presses is now being distributed by the Walker-Turner Co., Inc., Plainfield, N. J. Copy free upon request.

**Yoder Horizontal Boring Mill.** A six-page bulletin illustrating and describing the Yoder Horizontal Boring Mill for general machine shops, tool and die plants, production and miscellaneous plants, and so on, has been prepared for distribution by The Yoder Co., 5500 Walworth Ave., Cleveland, Ohio. Complete specifications are listed. Copy free upon request.

**Johnson Bronze General Catalog** The Johnson Bronze Co., 590 S. Mill St., New Castle, Pa., announces that its general catalog for 1941 is now ready. Between the covers of this catalog is listed and described a complete stock bronze service. Many new sizes of bushings have been added together with new types of electric motor bearings. Additional application data has also been included in the catalog, copy of which is available free upon request.

**2 OR 3 DAYS  
DELIVERY ON**

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**"Gaging Policy."** A 16-page "Gaging Policy" supplement to its book "Dimensional Control" which was published earlier this year is announced by The Sheffield Corp., Dayton, Ohio. Copy of supplement free upon request.

**Hannifin Pneumatic Bench, Drill Press and Milling Machine Vises** are described and illustrated in a four-page bulletin announced by the Hannifin Mfg. Co., 621-631 S. Kolmar Ave., Chicago, Ill. Copy of Bulletin No. 59 free upon request.

**"How to Select Control for D-C Motors."** The General Electric Co., 1 River Road, Schenectady, N. Y., has published an eight-page illustrated bulletin explaining in simple, "down-to-earth" language "How to Select Control for D-C Motors." The selection chart in the center spread of the bulletin should, the publisher states, be particularly helpful to all concerned with d.c. motors. Copy of Bulletin GEA-3531 free upon request.

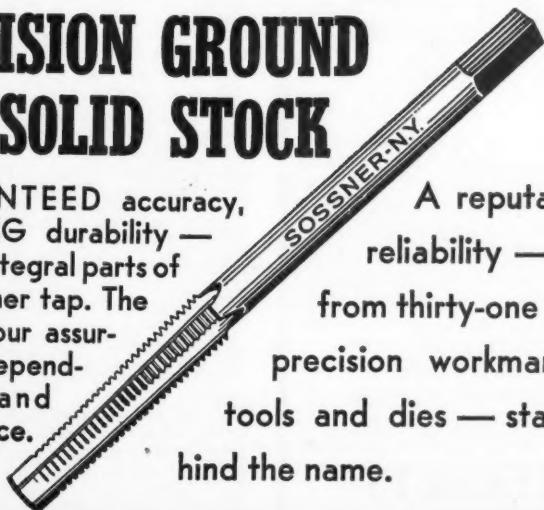
**"Preventing Oxyacetylene Cutting and Welding Fires"** is the subject of a 16-page profusely illustrated pamphlet issued by the National Fire Protection Association, 60 Batterymarch St., Boston, Mass. Copies of pamphlet may be obtained at 10 cents each.

**Bakelite Molding Plastics.** This 32-page illustrated booklet, publication of the Bakelite Corp., 30 E. 42nd St., New York, N. Y., contains descriptions of compression and injection molding processes and explains the essential differences between thermosetting (hot-set) and thermoplastic (cold-set) molding materials.

The physical, mechanical, and electrical properties and characteristics of "Bakelite" phenolics, ureas, polystyrenes, and acetates are enumerated in editorial and table form so as to give the reader an understanding of how these materials can be employed. Four studies in full color emphasize the unlimited, pleasing color possibilities of molded plastics for modern color styling. Copy of booklet free to managing executives upon request.

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**GUARANTEED accuracy,  
UNFAILING durability —**  
both are integral parts of  
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A reputation for  
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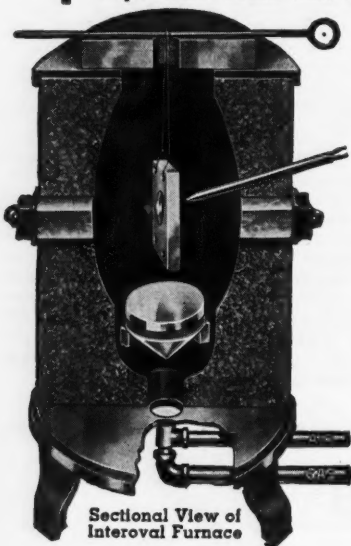
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No possibility of surface decarburization or distortion. Heat treats "Moly" steels without any trace of scale or soft skin.

This gas-fired furnace operates at 25c per hour for fuel. Heats to 2350° F. in 40 minutes in a non-oxidizing atmosphere. May be quickly converted into lead, cyanide or soft bath furnace.

Heating chamber—14" high, 9" in dia. at center, 7" at top.

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**INSURED STEEL TREATING CO.**  
130 SOUTH ST. NEWARK, N. J.

**G-E Electric Equipment for Aircraft Production.** An attractive 42-page bulletin containing illustrations and descriptions of the wide range of precision-built equipment now being offered by the General Electric Co. for the aircraft industry.



dustry has been prepared by this firm. The major part of the bulletin is confined to equipment for aircraft production although several pages are devoted to descriptions of equipment for installation in aircraft.

Described in the bulletin are load-center power distribution systems, motors and controls for many uses, resistance welding controls, arc welding equipment, heat-treating equipment, testing equipment, lighting equipment, and more on, and equipment for use in planes such as instruments, voltage regulators, motors, amplidyne sets, relays, generators, dynamotors, superchargers, radios and so on. Copy of Bulletin GEA-2395 can be obtained free of charge by writing to the General Electric Co., Schenectady, New York.

**"You Must Save Rubber."** To further assist manufacturers and users of industrial rubber products in the conservation of such materials, The B. F. Goodrich Co., Akron, Ohio, is now issuing through its industrial products distributors an 11 x 17½-inch wall poster entitled "You Must Save Rubber." The poster, which has a metal eyelet for easy hanging, includes, under eight subheadings, con-

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densed, simple rules for the conservation  
of industrial rubber products.

**Wiley's Diamond Wheel Dressing Tools** is the subject of a four-page folder released by Wiley's Carbide Tool Co., 1340 W. Vernor Highway, Detroit, Mich. The folder illustrates and describes both torpedo type and single diamond type dressers and includes prices and specifications. Copy free upon request.

"Chips" is the title of a 16-page booklet published by The Operators' Service Bureau, Warner & Swasey Co., Cleveland, Ohio, containing information on how lathe cutting tools can be made to perform efficiently, produce more pieces between grinds, "hog out" greater quantities of metal, turn out heavier chips, and so on. Copy free upon request.

**Wheelco Comments Vol. 1 No. 7.** Published by Wheelco Instruments Co., Harrison and Peoria Sts., Chicago, Ill., this issue features an article which il-

lustrates and describes the use of temperature control instruments in a pioneer midwestern heat treating plant. The article treats in particular an unusual temperature control application on a multiple-burner furnace. Copy of Wheelco Comments Vol. 1 No. 7 free upon request.

"3-M Products Used in the Victory Program" is the title of a 26-page catalog now being issued by the Minnesota Mining & Mfg. Co., Advertising Department, St. Paul, Minn. The catalog describes and profusely illustrates the use of various 3-M Abrasives and Scotch Tapes in relation to war production. Copy free upon request.

**Defense Emergency Screw Thread Data Book.** The Eastern Machine Screw Corp., Truman and Barclay Sts., New Haven, Conn., is now issuing a 24-page screw thread data book for defense emergency. The book, which is designated as bulletin No. 60, includes both foreign and domestic thread systems and can be obtained at 15 cents per copy.

## Extension Bed Gap Lathes



Illustrated is the Series  
"AG" 18/38" and 20/40"  
Extension Bed Gap Lathe  
with All Geared Head.

The EXTENSION BED GAP LATHE combines the features  
of a large and small swing lathe, giving longer distances  
between centers than the ordinary lathe. It is designed  
to be used either as a Gap Lathe or an Engine Lathe.  
Write for circulars.

**The Nebel Machine Tool Co.**  
CINCINNATI OHIO

**"C-F Positioners for Faster, Better, More Economical Welding"** is the title of a 16-page informative and well illustrated bulletin now being distributed by the Cullen-Friestedt Co., 1311 S. Kilbourn Ave., Chicago, Ill. Copy of Bulletin WP-22 free upon request.

**Kennametal Steel and Metal-Cutting Tools and Blanks.** Complete information on Kennametal Steel and Metal-Cutting Tools and Blanks is contained in a 36-page informative catalog announced by the McKenna Metals Co., 300 Lloyd Ave., Latrobe, Pa. Copy of Catalog No. 42 free upon request.

**Janette Custom-Bilt Electric Motor Bulletins.** Janette Mfg. Co., 556-558 W. Monroe St., Chicago, Ill., is now issuing a series of bulletins on custom-built d.c. electric motors; squirrel cage, induction, polyphase motors; single phase capacitor electric motors, three-lead special types; single phase electric motors, capacitor type; 60 cycle single phase electric motors, straight repulsion type; single phase electric motors, repulsion

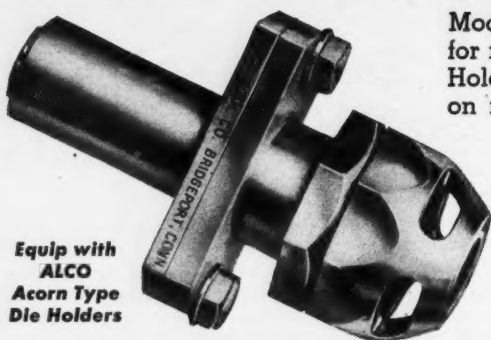
start, induction run, brush riding type, and split phase electric motors, resistance type. The bulletins are designated as the Nos. 9-25, 6-25, 5-27, 5-25, 4-27, 4-25, and 2-25 respectively. Copy of bulletins free upon request.

**"Filtaire" Portable Dust Collector.** A four-page illustrated folder covering the features, application, specifications, and so on, of the "Filtaire" Portable Dust Collectors is now being issued by the Edward Blake Co., 634 Commonwealth Ave., Newton Center, Mass. Copy free upon request.

**"Grits & Grinds" Vol. 33 No. 7** includes as its feature the second of two articles on the subject of gear tooth grinding. Also included are short articles entitled "Mushroom Pads Help Keep Them Flying," "Grinding Helps for New Grinder Men," and "Small End Mill Grinding Attachment." Number 11 of the series of cartoons "On the Grinding Line" is shown at the rear of the booklet, copy of which can be obtained free of charge by writing to the Norton Company, Worcester, Massachusetts.

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## FOR ALL AUTOMATIC SCREW MACHINES



Equip with  
**ALCO**  
Acorn Type  
Die Holders

Modern production demands call for modern equipment. ALCO Die Holders are standard equipment on most modern machines and

must on old machines — brings them up-to-date and makes them produce accurate work.

Stop those taper threads—  
Stop those torn threads—  
Cut perfect threads all ways.

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Write for catalog

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DETROIT OFFICE: — 908 STEPHENSON BLDG.

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**The Hough Shade Corp., Industrial** Div., Janesville, Wis., has issued a new bulletin No. 242 featuring RA-TOX Industrial Shades, Venetian Blinds and Steel Sash Ventilators.

**P&H Trav-Lift Crane Bulletin H-13.** An illustrated bulletin showing how P & H Trav-Lift Cranes can be used to speed production in many plants making war materials is now being issued by the Harnischfeger Corp., 4535 W. National Ave., Milwaukee, Wis. Copy of Bulletin H-13 free upon request.

**G-E 65-Ton Diesel-Electric Locomotive** for industrial switching is the subject of a 16-page bulletin prepared by the General Electric Co., Schenectady, N. Y. Features, operation, construction, applications, and so on, of the unit are covered in detail. Copy of Bulletin GEA-3598 free upon request.

**Jessop Washington Carbon Tool Steel**, a steel which is said to be widely recognized for its high quality and dependabil-

ity in the most severe tool and die applications, is covered in an eight-page bulletin prepared by the Jessop Steel Co., Washington, Pa. Copy of Bulletin 142 free upon request.

**Westinghouse Electronic Control for Resistance Welding.** A 38-page illustrated booklet giving a simplified explanation of electronic control for resistance welding, pointing out the different kinds of resistance welding that can be done, the function of the various controls, and the degree of accuracy made possible by electronic control, is announced by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. The various types of electronic control for resistance welding are illustrated and described. Also included are three pages of application data on the selection and application of a.c. single phase resistance welding control, an eight-page bulletin on fundamental electronic circuits, and a discussion of the cathode ray oscilloscope and its application to welding timers.

Copies of Booklet B-3102 can be obtained from any Westinghouse District Office free upon request.

# "WORKBENCHOLOGIST"

(Webster DOES NOT have a word for it)  
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For years we have been designing and building work-benches and other shop furniture to meet the needs of customers in nearly every field. We offer you a selection from 1367 "Hallowell" Bench Combinations and can tell you what your exact total costs will be on any given equipment. Our deliveries are better than average. Let us know your requirements.



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Fig. 928

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## A.S.T.E. Bibliography of Tool Engineering

A 300-page instructional book on "Advanced Blueprint Reading" has been added to the list of educational literature available for war production training of workers. The book, with a few other monographs, will complete the national defense training project of educational literature prepared under the supervision of the New York State Education Department and distributed with the cooperation of the A.S.T.E.

Still pending publications under the project and scheduled for publication within the next two months include the balance of a series on the Training of Women to add to the booklet on "Light Machine Operation" already issued; Part II of a two-volume book on Aircraft Assembly; an instructional book on "Layout" in the sheet metal series; a book on "Measurement" for the Electrical series, and a Teacher's Laboratory Organization Manual for Aircraft Inspection. A volume on "Tool Design" is also in preparation but publication date has not yet been scheduled.

Copies of the defense training books and monographs may be obtained di-

rectly from the New York State Education Dept., Albany, N. Y.

## Wanted—Tools

The Permanente Corporation, 1220 Latham Square Bldg., Oakland, California, is anxious to obtain the following, new, used, or rebuilt:

- 1 24 to 30-in. x 12 to 14-ft. (between centers) Quick Change Lathe.
- 1 each sizes  $\frac{1}{2}$  in. to  $1\frac{1}{2}$  in. inclusive No. 1655 Morse Straight Shank Chucking Reamer.
- 1 each sizes  $1\frac{1}{2}$  in. to 2 in., inclusive No. 1627 Morse Shell Reamer.
- 1 No. 506 Morse Arbor No. 4 Taper
- 1 No. 224A 2 to 6 in. Outside Starrett Micrometer Set.
- 1 No. 124 4 to 5 in. Starrett Inside Micrometer Adapter.
- 1 No. 665D Swivel Post Stud for Starrett.
- 1 No. 41 Armstrong Planing Tool Holder size  $\frac{3}{4}$  x  $1\frac{1}{2}$  x 10 in., cutter size  $\frac{3}{4}$  x  $1\frac{1}{2}$  inch.
- 1 No. 49 Armstrong Extension Shaper Tool, shank size  $\frac{3}{4}$  x  $1\frac{1}{2}$  in., bar size  $1\frac{1}{2}$  x 14 in., cutter size  $\frac{3}{4}$  in. square.

If You Want **PROMPT** Delivery  
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You can have a selection of more than 50,000 stock items, ready for immediate delivery. Or the experience of over fifty years of sprocket manufacturing is at your command in the efficient and rapid production of sprockets made to your most exacting specifications.

The CULLMAN catalog on sprockets is yours for the asking. It contains valuable information for sprocket users. Send for it today.

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**G. E. Atomic-Hydrogen Electrode Holder.** A new 16-page illustrated bulletin (GET-1062) recently issued by the General Electric Company describes in considerable detail the progressive steps in the adjustment and operation of the Atomic-Hydrogen Electrode Holder. "Right" and "wrong" methods of adjusting the electrodes and the hydrogen supply, striking the arc, controlling the arc length and current setting, starting the weld, etc., are treated at length. The bulletin is carefully organized throughout for quick reference. Write General Electric Company, Schenectady, N. Y., for free copy.

**Walker-Turner Radial Drill Presses** for drilling, tapping, profiling, and routing are described and illustrated in a four-page folder prepared by the Walker-Turner Co., Inc., Plainfield, N. J. Copy free upon request.

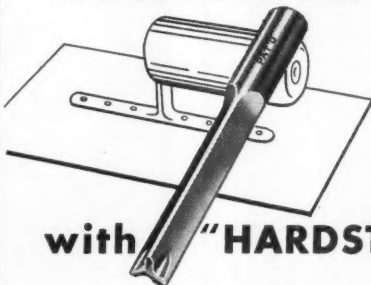
Our soldiers, sailors, and marines need planes, ships, tanks, ammunition, uniforms, and food. You can help to supply them by buying War Savings Bonds and Stamps.

**"Victory" Masonite Storage Cabinets and Lockers.** Bulletins containing complete information on its "Victory" line of Masonite storage cabinets and lockers are now available from The Interior Steel Equipment Co., 2352 E. 69th St., Cleveland, Ohio. free upon request.

**Handy & Harman Low Temperature Brazing News.** A bulletin on the subject of tool brazing and repairing by means of Easy-Flo brazing alloy is now being issued by Handy & Harman, 82 Fulton St., New York, N. Y. Copy free upon request.

**Cincinnati Wheel Balancing Arbors and Stands** for the complete line of grinding machines manufactured by Cincinnati Grinders Incorporated, Cincinnati, Ohio, are the subject of Bulletin G-454 now being issued by this firm. Copy free upon request.

## Production time cut from 24 HOURS to 2 HOURS— with "HARDSTEEL" DRILL



"With a 'HARDSTEEL' drill we now countersink more spring tempered steel trowel blades in two hours time than by former high speed steel countersinks in three 8-hour days—a saving of \$12.10 in wages alone while the operator has 22 hours left to do other work", writes Otto Heydrich, tool maker.

You, too, can drill, countersink, counterbore and ream hardened steels, hardened parts, dies, armor plate and other materials—Rockwell "C" 40 and harder—and do it faster, better, and cheaper with "HARDSTEEL".

New shop practice is:—harden first—then drill—to avoid misalignment of holes at assembly caused by heat treat distortion.



You harden it — we'll drill it  
with "HARDSTEEL"

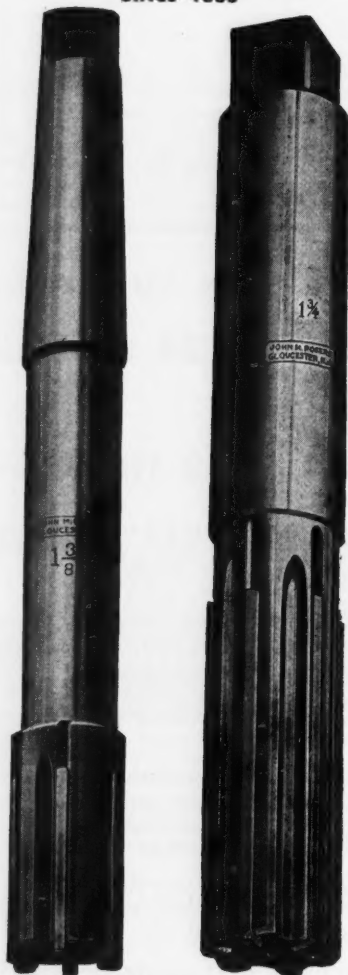
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SINCE 1885



Conserve High Speed Steel by using  
Rogers' Inserted Blade adjustable-for-  
wear Reamers.

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## "Chicago" Mounted Wheel Manual

To meet the need for information on  
the proper application of mounted  
wheels, the Chicago Wheel & Mfg. Co.,  
1101 W. Monroe St., Chicago, Ill., has



published an informative mounted wheel  
manual containing exact size and color  
illustrations. Shown in the manual are  
all types of mounted wheels and a wide  
array of accessories for use with high  
speed portable equipment. Contents also  
include a selection guide giving detailed  
information on the application of mount-  
ed wheels. A section is devoted to the  
newly developed mounted polishing  
wheel which is proving such a time-  
saver on many war production jobs.

A copy of the "Chicago" Mounted  
Wheel Manual may be obtained by writ-  
ing to the Chicago Wheel & Mfg. Co.  
at the above address.

## Victory Training Films

Victory Training Films now being pro-  
duced by the U. S. Office of Education  
are being used as feature pictures in  
industrial plant movie showings not  
only to train workers for specific jobs  
but to help develop general efficiency.

At the Ampro Corporation in Chi-  
cago, for instance, groups of employees

**Victory Training  
Films in Use in  
Class Work**

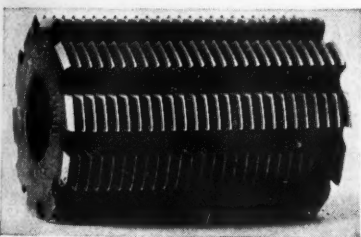
meet every week to view these new training films, as shown in the accompanying illustration. Entertaining and instructive shorts of a general nature usually precede the more serious and instructive films which teach employees machine shop techniques. Attendance averages about 70 per cent of the entire personnel.

Typical of the U. S. Office of Education Films shown are "The Steel Rule," "The Micrometer," "Height Gages and Standard Indicator," "Turning Work of Two Diameters," "Drilling, Boring, and Reaming Work Held in Chuck," "Cutting an External Thread," and other films of a specific nature. Favorable comment has been received on the prac-



tical value of these films. Even though the subjects may not apply directly to the work of every employee, they do serve to develop an appreciation of precision work.

The U. S. Office of Education has assigned the marketing of the Victory Training Films to Castle Films with offices in New York, Chicago, and San Francisco. Films may also be obtained from Ampro Educational Dealers.



## MULTIPLE THREAD MILLING HOBS

—in any thread system, any thread angle, any thread form. Inch or metric scale. Left or right hand threads. Free from distortion. Up to 7" O.D., and 4" thread length for internal or external threading.

### TOLERANCES: FOR THREAD DEPTHS AND PITCHES LESS THAN 1/10,000 INCH

These hobs precision cut by methods used for more than 25 years, eliminating any discrepancy between thread form and form of finished work, thus speeding up production without sacrificing accuracy. Full details upon request to Dept. T. Delivery Time: From 1 Week On.

**U. S. MACHINE TOOL MFG. CORPORATION**  
100 SO. 6TH STREET TERRE HAUTE, IND.

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MACHINE WORK • CASTINGS • HEAT-TREATING  
FORGINGS • EMPLOYMENT • BUSINESS • ETC.**

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Wood and Metal — also Match Plates.  
For all kinds of castings—large or small.  
*Estimates on Request.*

**GENERAL PATTERN WORKS**  
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## AUTOMATIC AND HAND SCREW MACHINE PRODUCTS

... up to 2 1/4" diameter—any material—  
small or large quantities. Prompt service.

**IMSANDE SCREW PRODUCTS CO.**  
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## GRIND THE *Eastern Centerless Way*

Our new plant with  
increased facilities  
assures

**PROMPT SERVICE**  
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SINCE 1925

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*Straight, Cylindrical, Shoulder, Profile, and  
Multiple Diameters . . . Ground Taper Pins*  
Screw Machine Products. Heat treated and ground  
if necessary. Improved and expanded facilities in-  
sure prompt and accurate service.

*Send blueprints or samples for estimates.*

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**GEARS CAMS  
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Excellent facilities for grinding  
gears, cams, threads and splines  
on a contract basis.

*SEND BLUEPRINTS FOR ESTIMATE*

**HARTFORD SPECIAL  
MACHINERY COMPANY**  
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## THREAD MILLING

Up to 12" in diameter internal and external  
Long Lead Screws

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## Expert Stopwatch Repair Service

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Due to the shortage of stopwatches, we suggest you have yours overhauled and rebuilt by specialists. Send to us by parcel post or express for estimates. Prompt service. Work guaranteed.

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### NEW PRODUCTS FOR PRESENT OR FUTURE DEVELOPMENT

Our client, a large reputable, nationally known manufacturer is seeking new products or design improvements in the field of industrial equipment and consumer's durable goods. Also interested in new manufacturing processes which can be applied to heavy machinery. All propositions submitted in confidence. State only general field of application in first letter. Address —Bosley Associates, Room 1853, Daily News Building, Chicago, Illinois.

## WANTED

Universal Iron Worker, small or medium size.

Give description and cash price.

**RICHARDSON • Cawker, Kansas**



## PRECISION GRINDING

A COMPLETE PRECISION GRINDING SERVICE

CENTERLESS GRINDING  
INTERNAL CYLINDRICAL GRINDING  
EXTERNAL CYLINDRICAL GRINDING  
BLANCHARD SURFACE GRINDING  
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THREAD GRINDING



Send Blueprint Sketch or Samples for Quotation

**ACE MANUFACTURING CORP.**

1221 E. Erie Avenue, Philadelphia, Pa.

## Bar Stock Wanted

We will purchase any available surplus stocks of round bars, hot rolled or cold drawn, in the following grades of steel:

### SAE Nos.

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2330	3115	3135
	3120	

**MODERN COLLET AND MACHINE COMPANY**

401 Salliotte St.

Ecorse, Mich.

Get OUT THE SCRAP and put it INTO SERVICE for the U. S. A.

We buy high-speed scrap and surplus tools. Let us pick over your high-speed scrap accumulation. We pay more when they can be reground into usable tools. **Get them into the war production!**

**AMERICAN TOOL SALVAGE CORPORATION**

100 S. Jefferson St.

Chicago, Ill.

## Advertise Your Service

IN THIS

## SERVICES DIRECTORY SECTION

WRITE FOR RATES

**MODERN MACHINE SHOP • 431 MAIN STREET CINCINNATI, OHIO**



"Whose Side Is He On?"

By Wesser



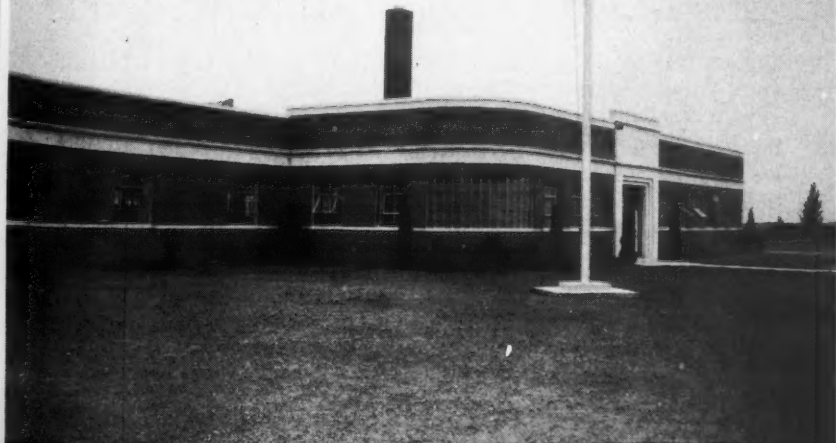
# *A New Modern Plant for*

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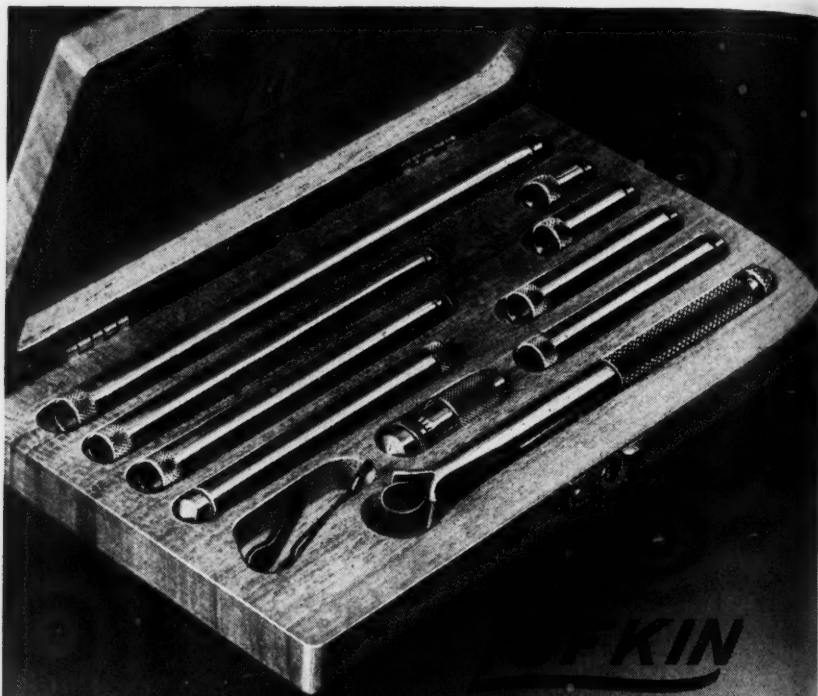
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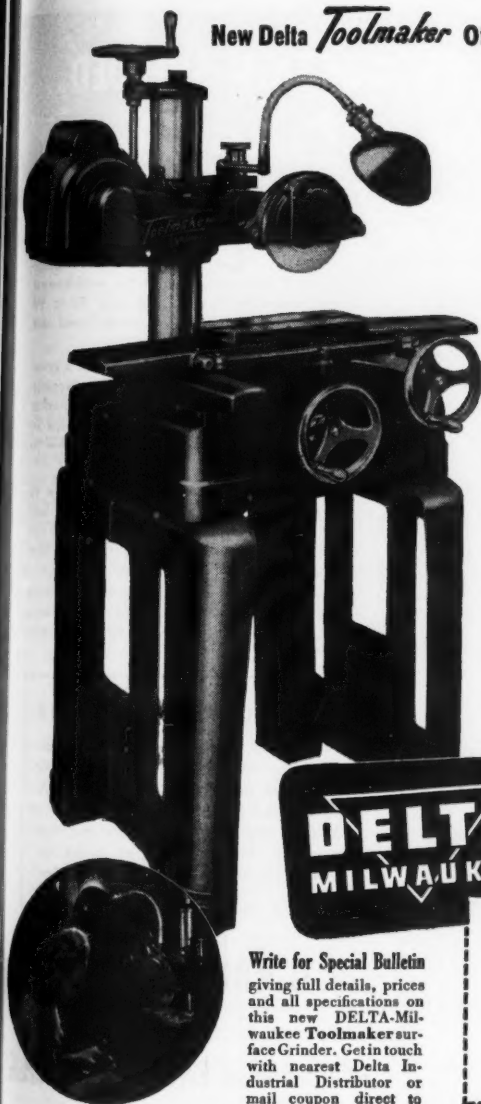
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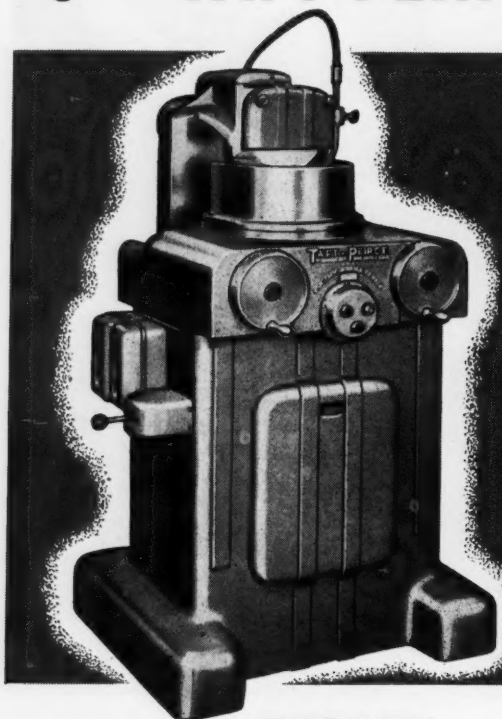
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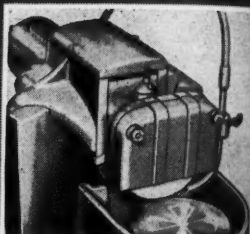


## ... this time in **ROTARY** *Surface Grinding*

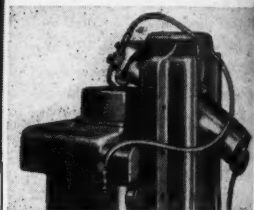
SHARP ADVANCES in output, quality, and economy of small rotary surface grinding work are accomplished facts wherever this new Taft-Peirce machine is in service. Distinctly different in many features of design, the 6" Rotary Surface Grinder produces, almost effortlessly, surfaces which are flat to extremely close tolerances. ... Long service life is underwritten by precision hardened and ground ways and full ball-bearing construction.



**THE TAFT-PEIRCE MFG. CO.**  
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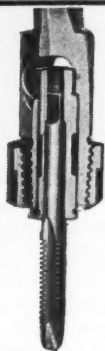
should the tap strike bottom or stick due to tap loading.

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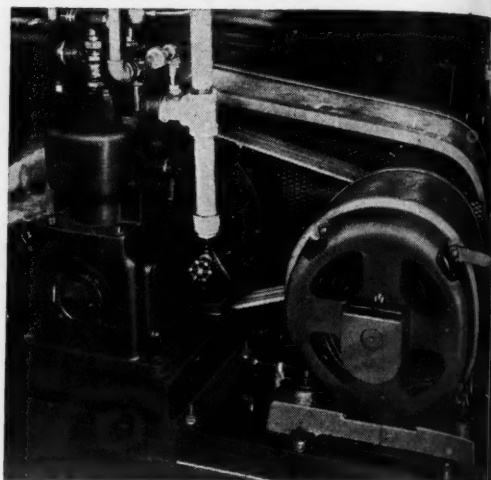
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- 3. Highspeed Tapping Machines**  
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- 4. Tool Steel for the Non-Metallurgist**  
Helpful 32-page booklet titled "Tool Steel for the Non-Metallurgist" is available from Crucible Steel Company of America, 405 Lexington Ave., New York, N. Y.
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From South Bend Lathe Works, Dept. 4Z, South Bend, Ind., may be had new catalog No. 16, featuring South Bend Precision Lathes.
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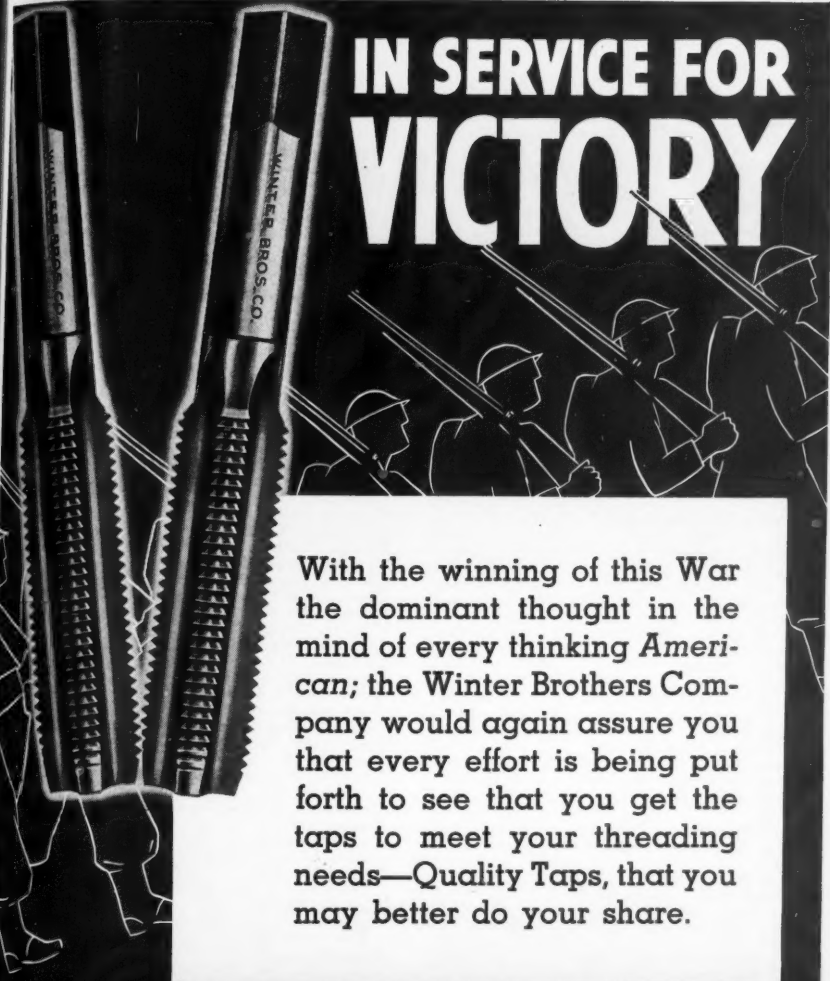
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